XEBEC®
BEAUTIFUL DEBURRING

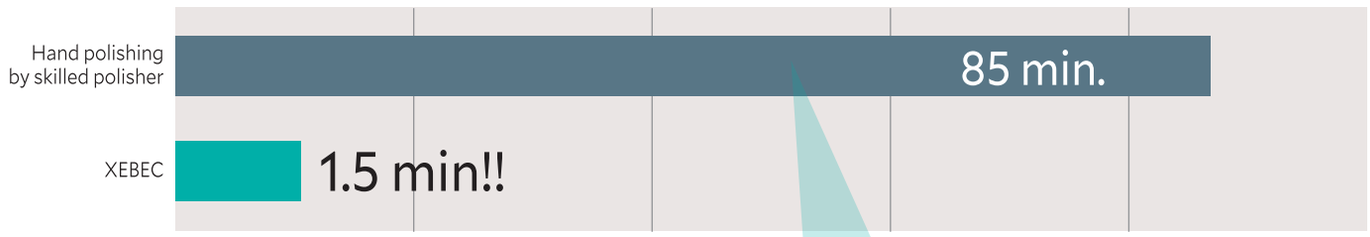
PRODUCT DATA SHEET

Mold polishing

Hand polishing by skilled polisher 85min. versus
Automated polishing by XEBEC Brush™ 1.5min

METRIC CONVERSION	micrometer		microinches
	1 µm	=	**39.4 µin**

◆ NAK steel polishing time trial



Experiment setup

The polishing was conducted using identical conditions for 3 skilled polishers (target material for polishing & tools for polishing).

Material

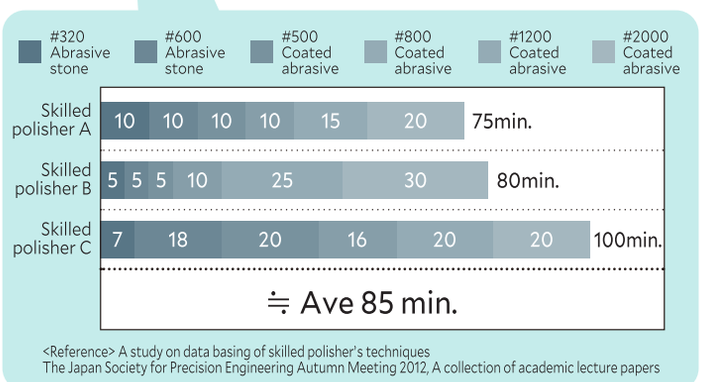
NAK80 steel 40x40mm Polishing flat surface
(≒ X40CrMoV51, Prehardened Steel)

Before polishing (After milling process)

Surface roughness : Ra 0.34µm

After polishing process

Surface roughness : Ra 0.02µm



<Reference> A study on data basing of skilled polisher's techniques
The Japan Society for Precision Engineering Autumn Meeting 2012, A collection of academic lecture papers

Automated polishing by XEBEC Brush™

Material

NAK steel 70x70mm Polishing half area of pocket processed surface (≒ X40CrMoV51, Prehardened Steel)

Before polishing (After ball end milling process)

Surface roughness : Ra 1.4µm, Rz 6.1µm

After polishing process

Surface roughness : Ra 0.029µm, Rz 0.337µm

Tool used

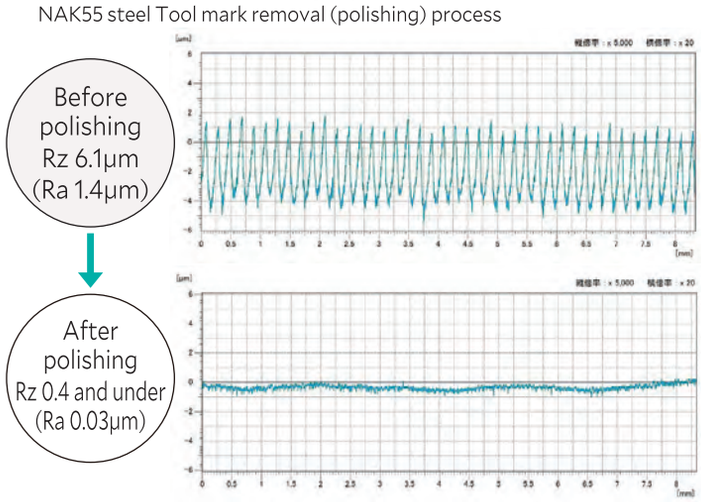
XEBEC Brush™ Surface
A32-CB25M(Blue)
A11-CB25M(Red)

Processing parameters

Rotation speed : 5000min^{-1}
Feed : 500mm/min
Depth of cut : (Blue)0.3mm
(Red)0.2mm

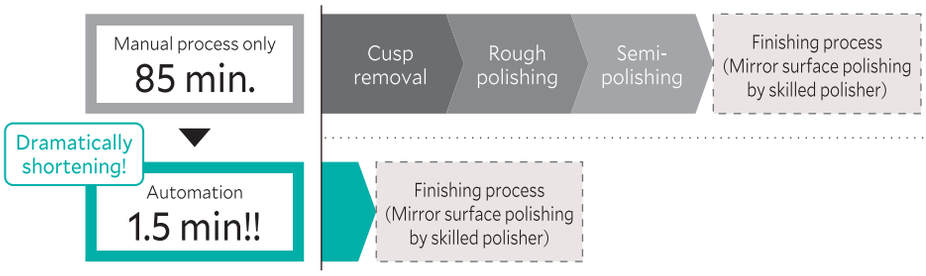
◆ Automated polishing by XEBEC Brush™

NAK55 steel Tool mark removal (polishing) process



Proposal for major shortening of prosessing by means of automated die and mold polishing

◆ NAK steel Comparison of polishing time



Techniques of skilled polishing can be used only for integrating the final stages in the process of polishing mirror surfaces, etc. !

	Merits	Demerits
Hand polishing	① Curved surfaces and complex shapes can be dealt with flexibly.	① It takes time (If the worker is not skilled, processing time is even longer.) ② Things, such as the competence levels of the workers, yielded quality and processing time differences.
Auto-mated polishing	① Automated deburring and polishing process right after cutting process in the same machining. (Cusp removal~semi-polishing) ② Possible to shorten polishing time dramatically. ③ Automation resulted in stable quality, eliminating quality variations due to manual processing.	① Programming is necessary for complex shapes and curved surfaces. (OK if it can be made to follow the shape.) ② It is unsuitable for critical edge requirement. (Deburring effects of approx. 0.1mm)

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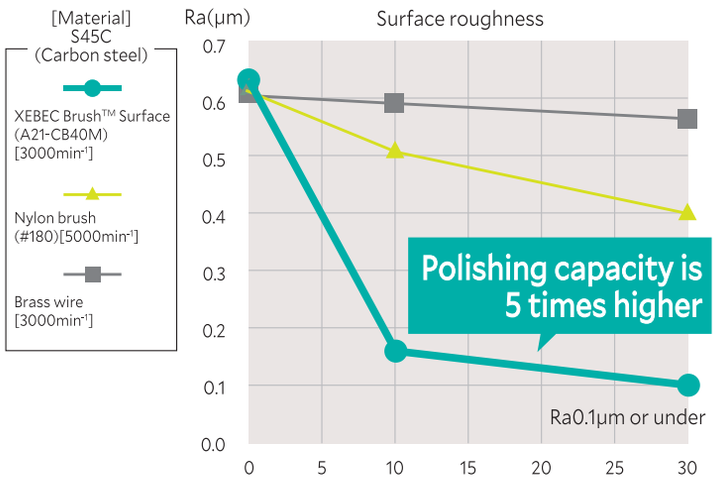
	1 µm	=	**39.4 µin**

Comparison of grinding capacity with other companies' products



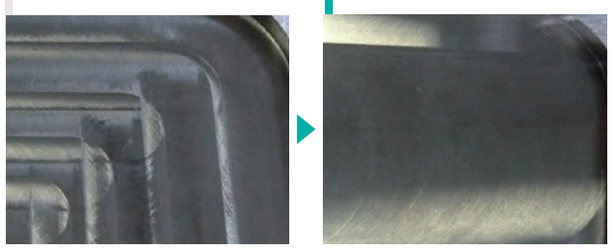
- XEBEC Brush™ Surface / Improved approx. 0.5µm in 10sec.
- Nylon brush / Improved approx. 0.1µm in 10sec.
- Brass wire / No improvement

Best surface roughness Ra=0.029µm

The superfine fibers, measured in micrometers, can improve surface roughness in a short time.

Before polishing
Rz = 6.1µm
Ra = 1.4µm

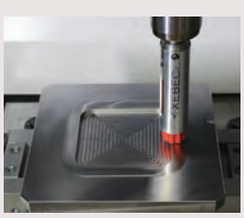
After polishing
Rz = 0.337µm
Ra = 0.029µm



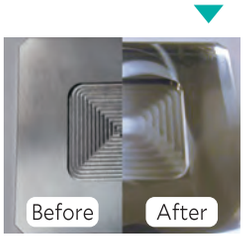
- Material / NAK55 steel
- Tool used / A32-CB25M → A11-CB25M
  S5000 / F500 / D0.3→0.2

XEBEC Brush™ Polishing Applications

Pocket part flat surface polishing



After end milling
Rz 1.56µm
Ra 0.21µm
Dim. 100×100
(Pocket Part)

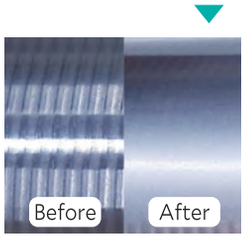


After polishing
Rz 0.35µm
Ra 0.03µm

Material	SUS304/HRC10
Tool used	A32-CB25M, A11-CB25M
Rotational speed	(A32) 3200min-1, (A11)4000min-1
Feed	(A32) 1500mm/min, (A11) 6000mm/min
Depth of cut	(A32) 0.1mm, (A11) 0.3mm

Curved surface polishing

After ball end milling
Rz 48µm
Ra 15µm
Dim. 70×70



After polishing
Rz 0.98µm
Ra 0.12µm

Material	SUS304/HRC10
Tool used	A32-CB25M, A11-CB25M
Rotational speed	5000min-1
Feed	(A32) 1500mm/min, (A11) 6000mm/min
Depth of cut	0.3mm

Hardened steel mirror polishing

After end milling
Rz 1.99µm
Ra 0.25µm
Dim. 80×80

After polishing
Rz 0.52µm
Ra 0.05µm

Material	SKD11/HRC62 (≒X165CrMoV12)
Tool used	A32-CB100M, A11-CB100M
Rotational speed	1200min-1
Feed	600mm/min
Depth of cut	0.2mm