

Sales Contact: sales@semistarcorp.com

Tokyo Diamond Tools Mfg. Co., Ltd.

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Who is “Tokyo Diamond Tools” ?

By Diamond Tools, we’ve contributed Japanese “Monozukuri/Manufacturing” for more than 90 years.

We “Tokyo Diamond Tools” is located at heart of Tokyo, Japan.

And we have enormous experience at wide range of the production process regarding diamond tools, for more than 90 years.

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What we can bring?

We, Tokyo diamond Tools, provide you the solution for your problems

Regarding the diamond tools which you are currently using at your production, are you facing any issues of Quality, Cost, Delivery and Service?

If you do, please kindly contact to us. It would be our pleasure to provide you the solutions by designing special equipment together with you.

Depending on your requirements, we will custom-design the product even from 1pc.

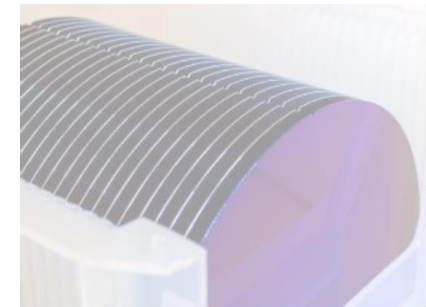
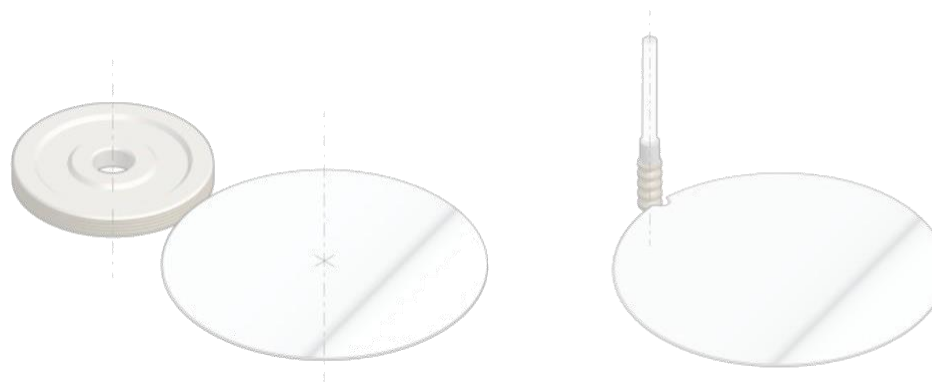
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For what kind of application?

Our wheels suit for the **EDGE GRINDING & NOTCH GRINDING** process of wafer production

Our special designed metal bonding diamond wheels have been used for the world major manufacturers who takes the process of edge grinding & notch grinding of the wafer



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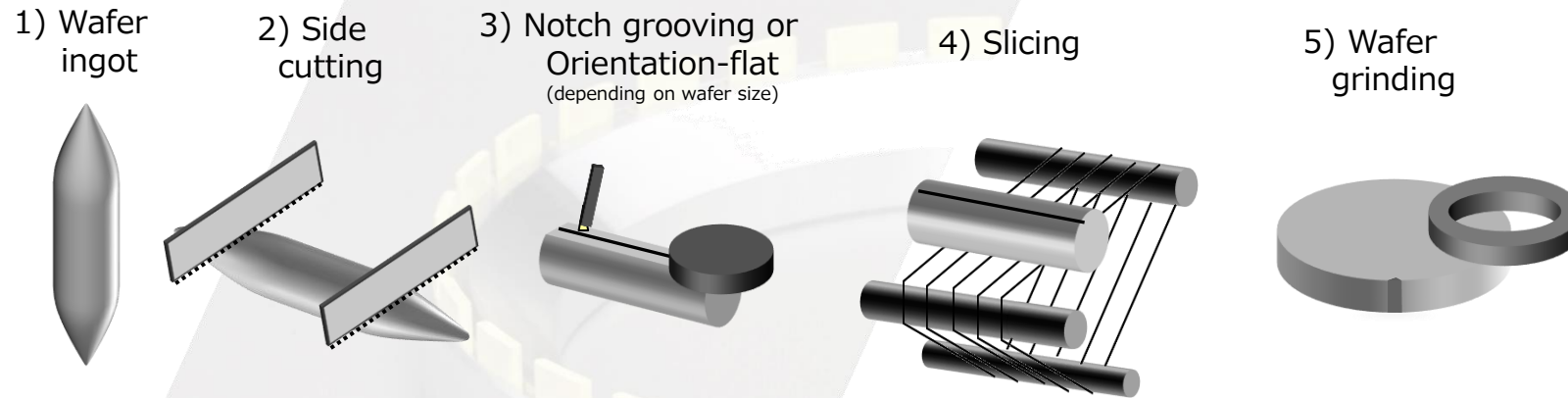
“Edge grinding & Notch grinding” Spec introduction”

- Metal bond Wheel -

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What are “Edge grinding” & “Notch Grinding”?



Type of Orientation-flat & Notch

Tokyo Diamond's proposable application

Orientation-flat
≤150(6inches)

Notch
≥200(8inches)

p-type
<111>

n-type
<111>

P-type
<100>

n-type
<100>

≥200mm

These are the marking to see the orientation depending on the size of the silicon wafer

Application	Applicable work materials
Edge grinding wheel	Silicon Silicon-Carbide(SiC)
Notch grinding Wheel	Sapphire GaN

6) Edge grinding (Beveling)

Edge grinding wheel

Side view

Removing the burr & chamfering corner

7) Notch grinding

Notch grinding wheel

Top view

Removing the burr & chamfering corner at notch area

Specifications

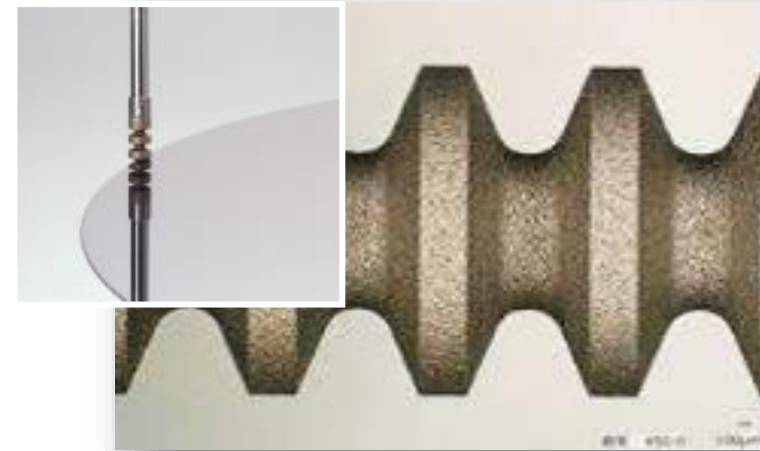
Edge Grinding wheel



Items	Specification
Grain size	#400~#3000
Bonding	Metal bonding
OD	~202D
ID	H6 (TBD)
Dynamic Balance	≥0.1g@Min.
Groove θ tolerance	≥0.5°
Number of groove	Up to 10
Base material	SUS, Al and others
Lead time	New M wheel: 40days Repair: TBD
Work materials	Silicon, Silicon-Carbide(SiC), Sapphire, GaN

*Multiple size available

Notch Wheel

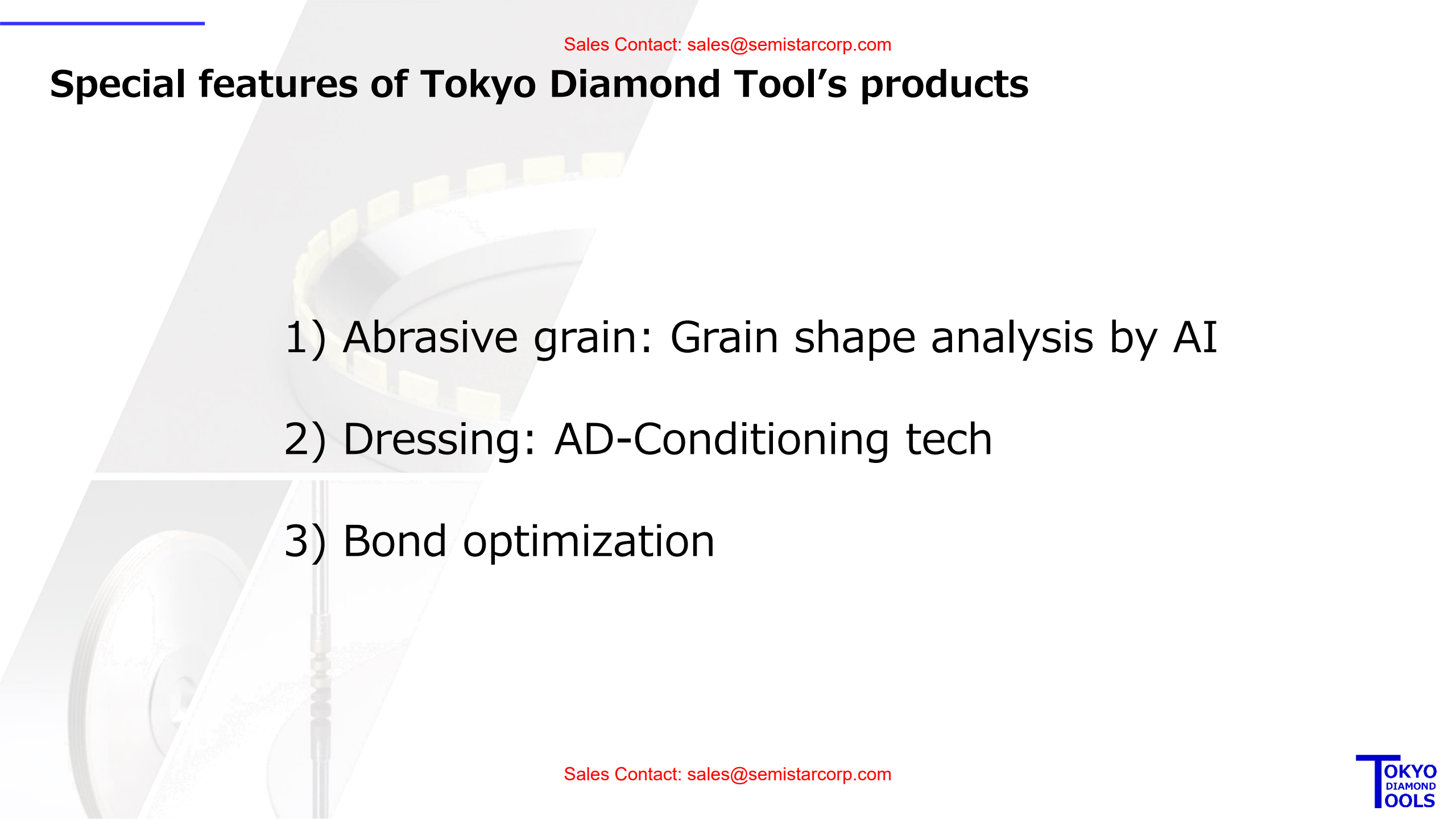


Items	Specification
Grain size	#400~#3000
Bonding	Metal Bonding
OD	~4D with core (Min.2D)
Shaft Diameter	H6
Overall length	~35L
Runout accuracy	≤5um @ Min.
Groove shape	Tolerance ≥ 1 degree @ opening angle
Number of groove	~ 5 grooves
Shaft material	SK and others
Lead time	28days
Work materials	Silicon, Silicon-Carbide(SiC), Sapphire, GaN

*Multiple size available.

Screw type and straight type are also available.

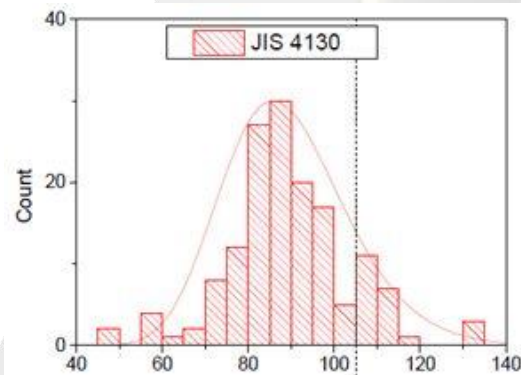
Special features of Tokyo Diamond Tool's products

- 
- 1) Abrasive grain: Grain shape analysis by AI
 - 2) Dressing: AD-Conditioning tech
 - 3) Bond optimization

1) Abrasive grain shape management

Usual operation

- 1) Abrasive grain size distribution check @ receiving inspection



- 2) Using it for production

Inspecting the abrasive size, but not for the abrasive shape.

Tokyo Diamond Tools' operation

- 1) Abrasive grain size distribution check @ receiving inspection

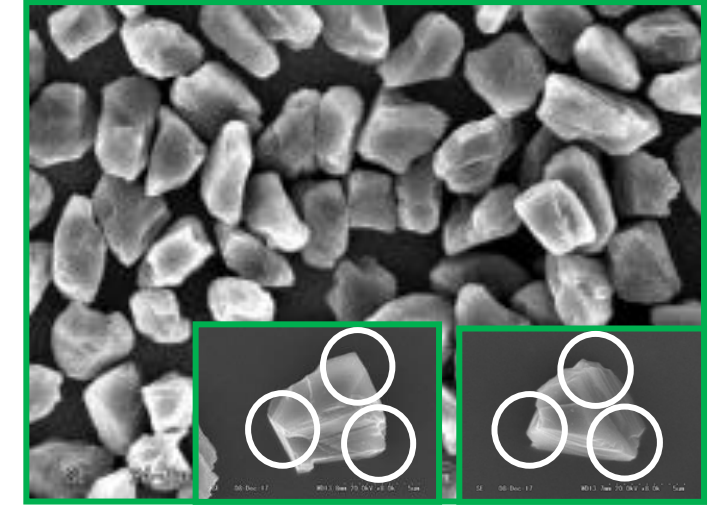
2) Abrasive grain shape inspection by AI

- 3) Using it for production

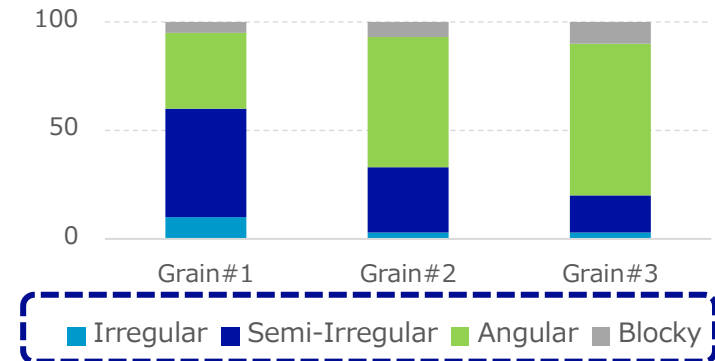
By saving not only the abrasive size data but also the abrasive grain shape data, more detailed verification or proposal would be available.

e.g.
#1 product ⇒ NG
#2 product ⇒ OK

In the case that there is no other difference at production process or material, more detailed verification would be available by checking the abrasive grain shape ratio.



Ex. Grain type analysis

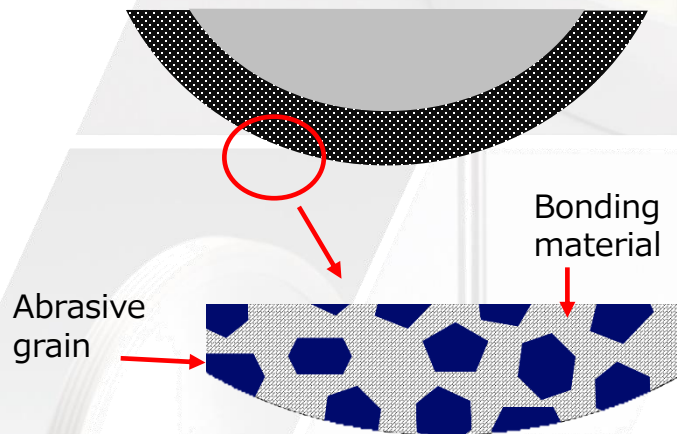


2) Automated machine Dressing - AD Conditioning Tech -

AD(Advanced) Conditioning Tech is our original dressing method to make the abrasive grain protrusion uniformly by automated machine.

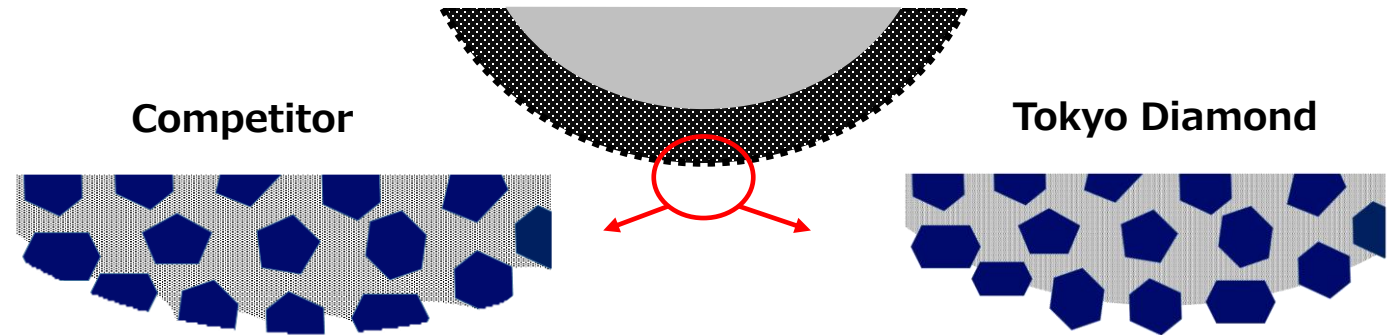
Truing

Remove the irregularities of the surface & runout, and produce the perfect circle (Truing)



Dressing

Remove the bond and protrude the cutting edge (dressing)



	Dressing method	Cutting edge	Bond	Result
Competitor	Stick by manual	Cutting edge of the diamond is also cut to be rounded and dull	Bond is on one side, and the rotational direction has been set	Unstable processing
Tokyo Diamond	By automated-machine	Cutting edge of the diamond is remained and sharpened	Bond is flat to the base, and can be used either way of the rotation	Stable Processing

As the result, tool life will get longer!

2) Automated machine Dressing - AD Conditioning Tech -

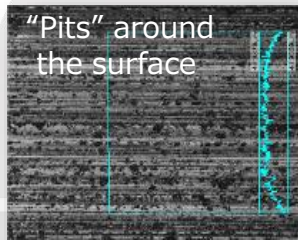
As a result of our automated-machine dressing(AD Conditioning Tech)...

- 1) Create the stable cutting edge at the abrasive grain surface
- 2) Improve the surface quality & bring the longer life

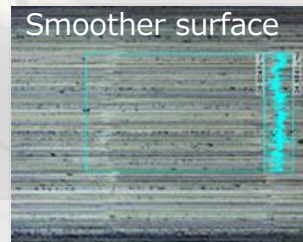
Edge wheel(#1500)

Surface comparison

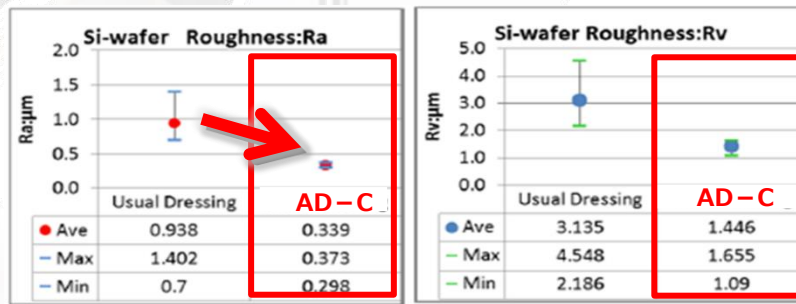
Stick dress



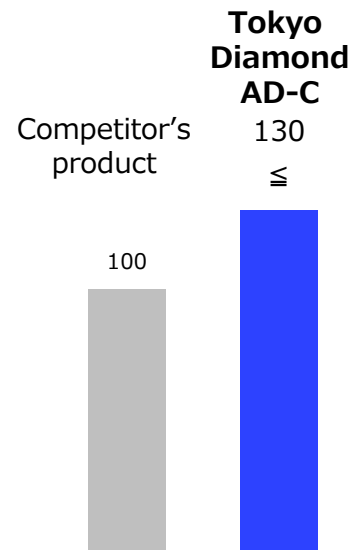
AD-Conditioning



Roughness comparison

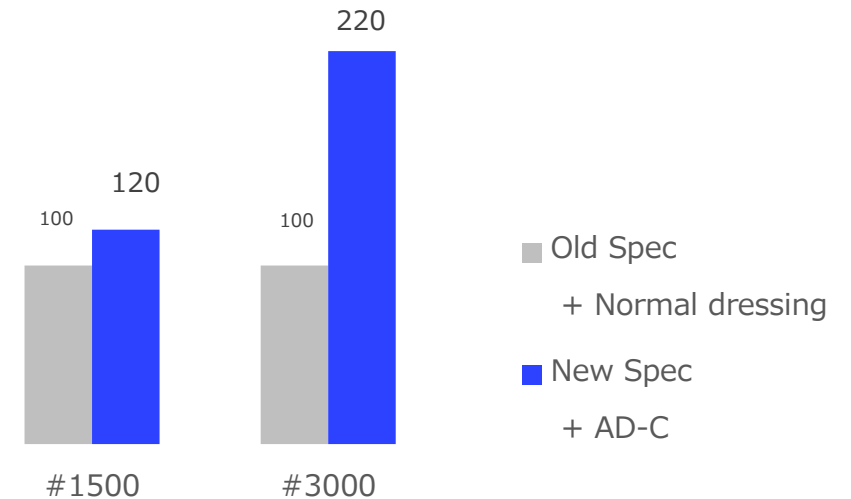


Life comparison



Notch wheel(#1500/#2000)

Life comparison



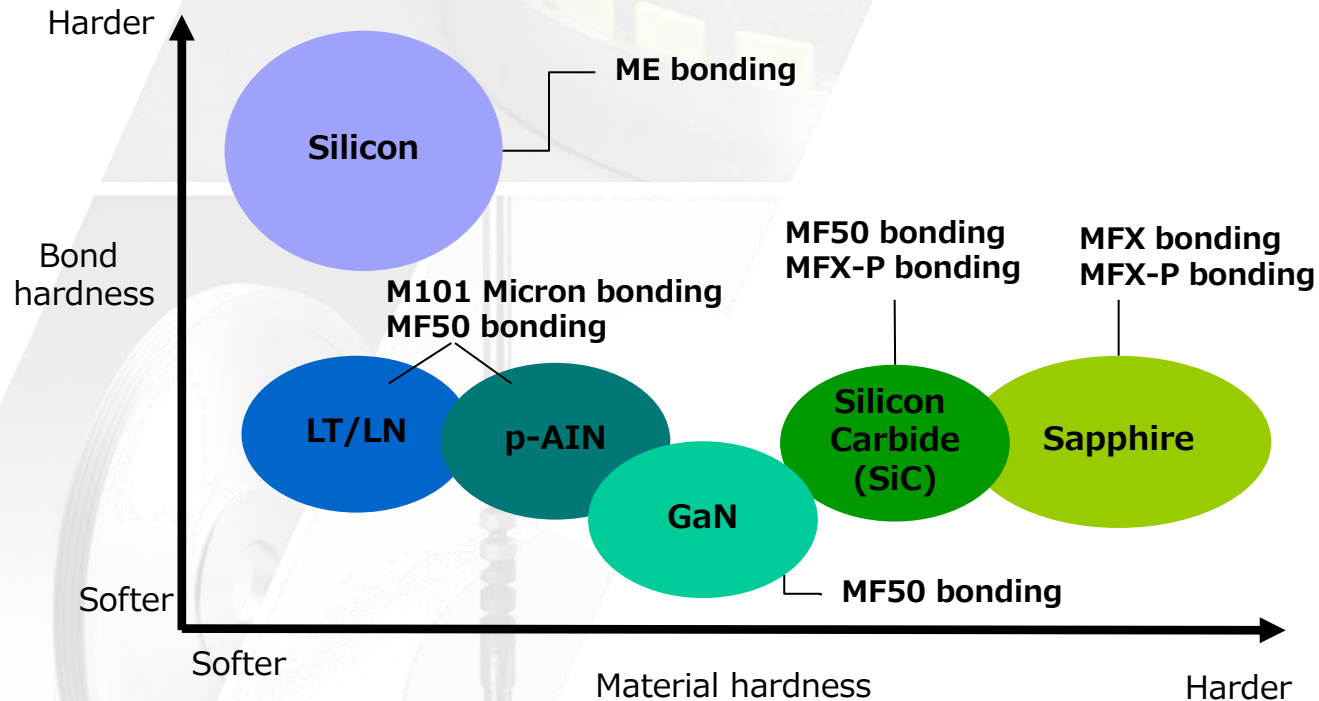
AD-C tech extends tool life dramatically!

3) Bond optimization

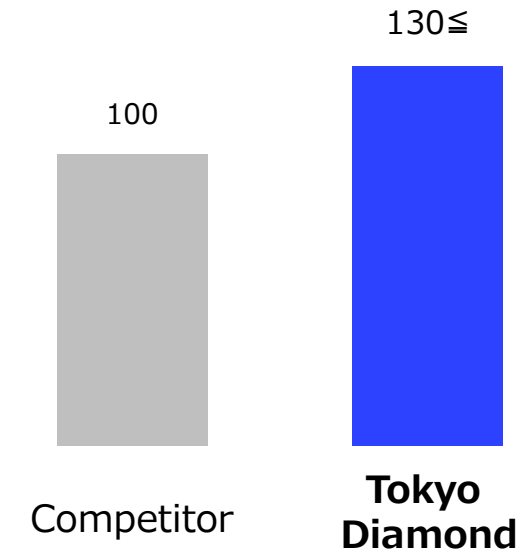
Since the bonding materials is the one of the key factor for the grindability & tool life, we provide our original optimized bonding for the each wafer materials.

(Basic idea: Hard bonding for softer material and soft bonding for hard material)

Tokyo Diamond Original Bonding choices



Tool life comparison

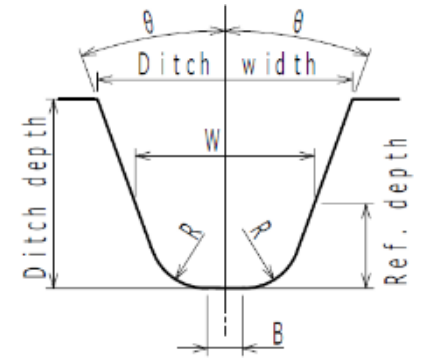


*Competitor is defined as "100"

Roadmap -Edge grinding (Beveling)-

Specification Examples

Specification items	Current tolerance		Improving tolerance	Improved rate
θ (Groove angle)	$\pm 0.5^\circ$	➔	$\pm 0.3^\circ$	▲ 40%
W (Width)	$\pm 10\mu\text{m}$		$\pm 7\mu\text{m}$	▲ 30%
R (Corner R)	$\pm 10\mu\text{m}$		$\pm 7\mu\text{m}$	▲ 30%
B (Bottom length)	$\pm 10\mu\text{m}$		$\pm 7\mu\text{m}$	▲ 30%



In accordance with the increasing requirements for accuracy, we are developing products with tighter tolerances products.

We “challenge to change” with you

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Tokyo Diamond Tools Mfg. Co., Ltd.

2-3-5 Nakane, Meguro-ku, Tokyo 152-0031, Japan
Tel: +81-3-3723-8111 / Fax: +81-3-3724-8573

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