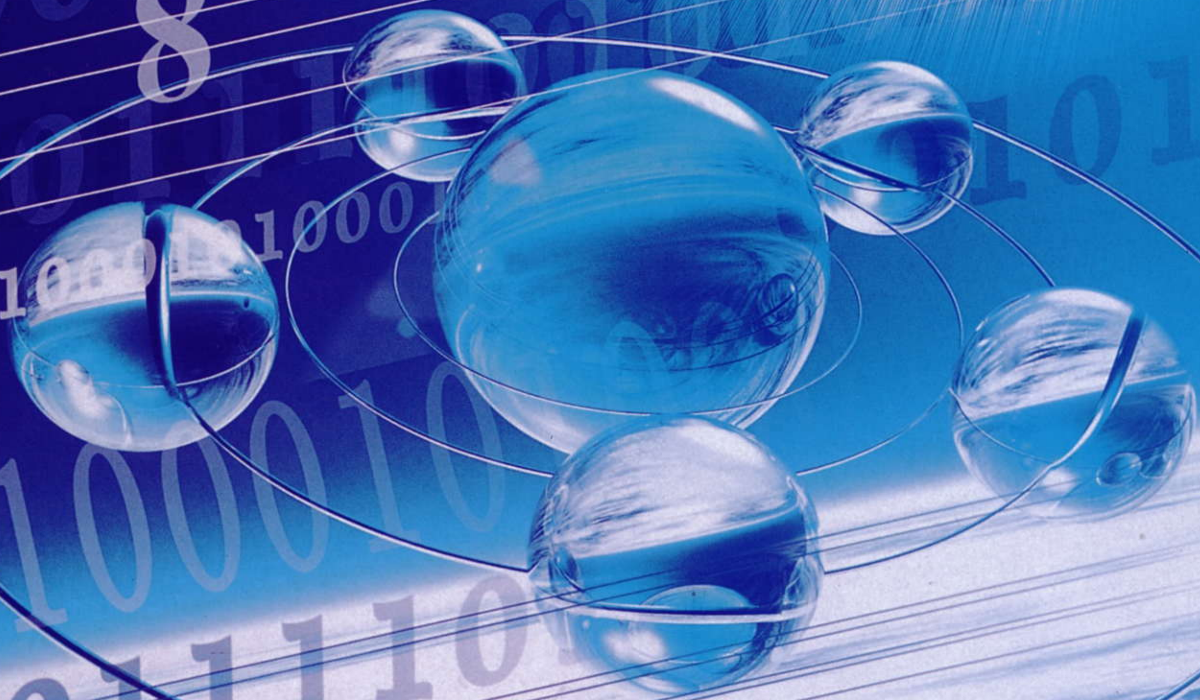
NORITAKE

Diamond Tools for

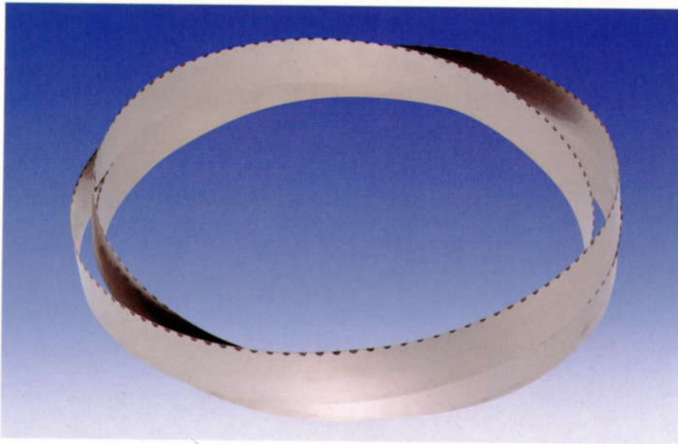
Electronic Semiconductors

IT Industries



Noritake Co., Ltd.

Electroplated Diamond Band Saw



General description

Noritake has developed a high performance diamond band saw that can effectively and precisely cut fragile materials such as, semiconductors or magnetic materials.

Feature

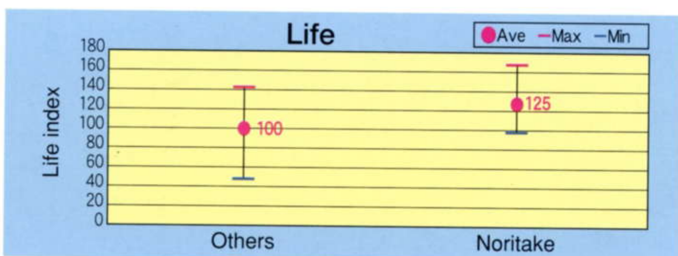
1. Our original electroplating pattern allows highly effective and precise cutting.
2. Long life can be expected by a highly precise and rigid band material.
3. Ultimately thin blade allows high yield rate.

Application

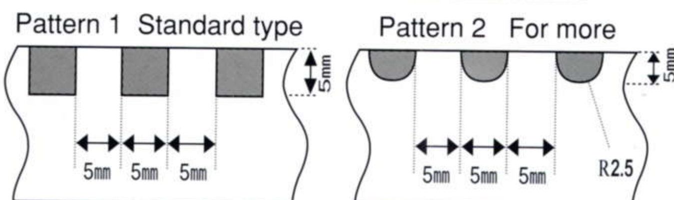
1. Cutting fragile materials such as semiconductors, glass and magnetic materials
2. Highly precise cutting of silicon ingot (cutting the ingot's edge, slicing the sample wafer)

Specifications

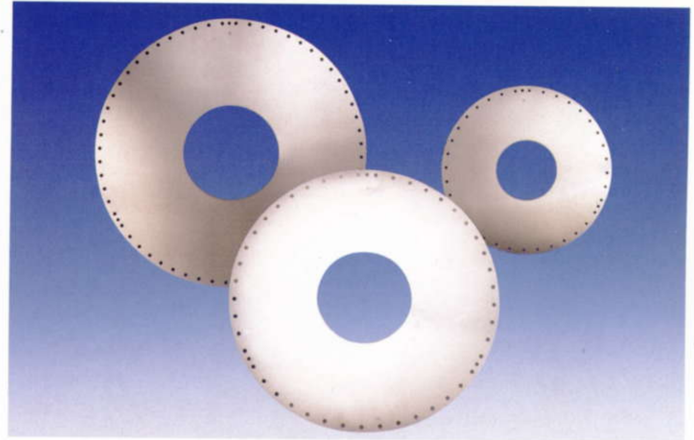
Standard spec. / SD40～SD200PA5
Substrate width / 10～60mm
Abrasive coating thickness / 0.7～1.5mm
Peripheral length / 1500～5500mm
Substrate thickness / 0.5～1.0mm



Example of electroplated pattern



Ultra Thin Inner Diameter Electroplated Diamond Blade



General description

A higher cutting yield rate can be expected by our ultra thin blade.

Feature

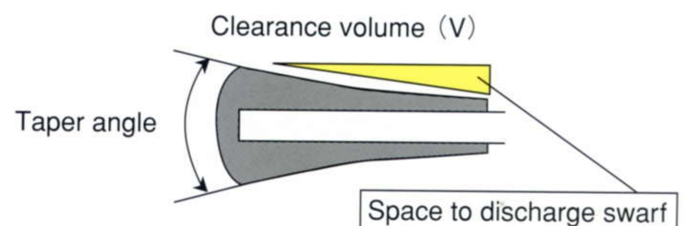
1. High rigidity core material
2. Superior cutting can be expected by using ultra thin core and fine abrasive grains and by selecting optimal blade's specification.
3. Keeping sufficient clearance angle as shown below make it easier to discharge swarfs and to stabilize the ability of the cutting.

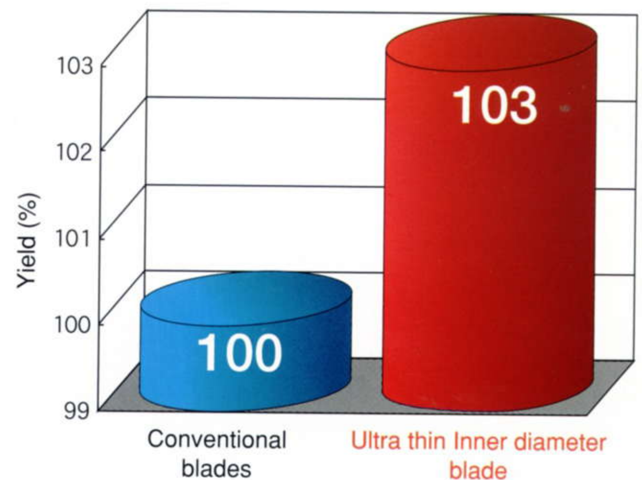
Application

1. Silicon ingot slicing
2. Highly precise cutting of silicon ingot
3. Peripheral length / 1500～5500mm
4. Substrate thickness / 0.5～1.0mm

Specifications

SW27 Standard spec. D40 / 60μm PEL (Dimensions) Outer diameterϕ690 x Inner diameterϕ240 x Substrate thickness 0.10 x Blade thickness 0.26～0.28
SW34 Standard spec. D50 / 70μm PEL(Dimensions) Outer diameterϕ860 x Inner diameterϕ305 x Substrate thickness 0.13 x Blade thickness 0.28～0.32





Attention:Those rates may change due to condition and are not to guarantee the efficiency of performance

Nano Finisher V (Vitrified Bonded)

General description

Nano finisher is made by uniformly distributing and binding the extremely fine diamond abrasive grains with a special manufacturing process. This special bond system makes it possible to obtain a high grade fine surface finish with very few scratches and mechanical damages.

Feature

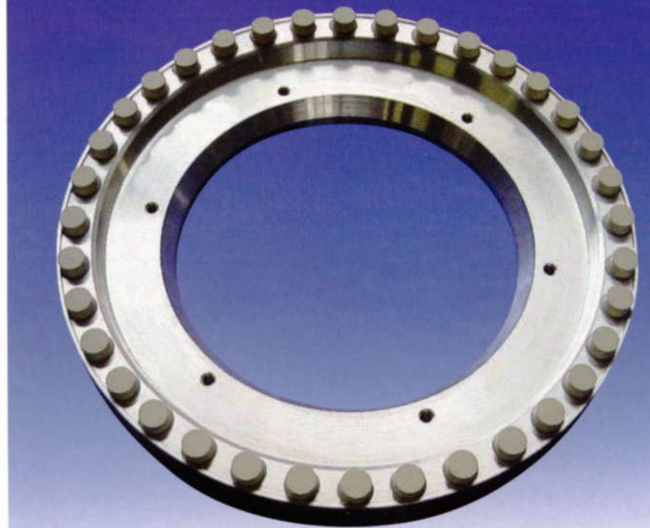
1. Able to obtain a highly flat surface reducing undulations and edge breakdown.
2. Easy to obtain a high grade surface finish without elaborate conditioning with

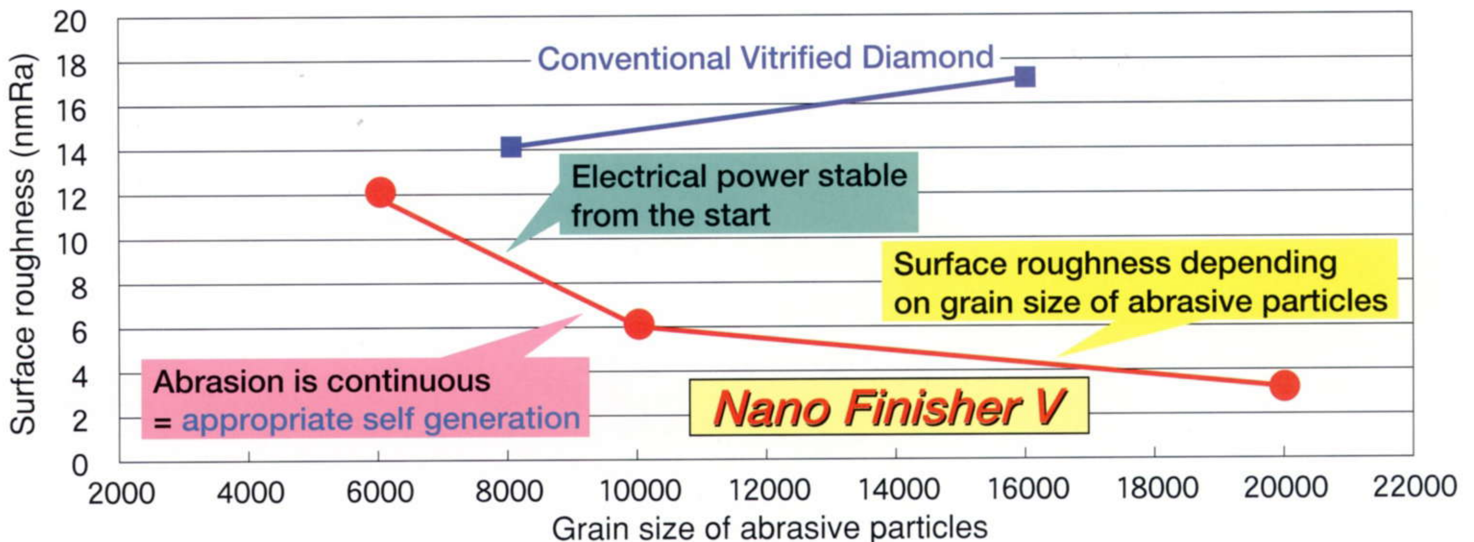
Application

1. Silicon bare wafer surface polishing.
2. Metallic mold's surface mirror-finishing.

Specifications

Standard spec. / SD12000 V ϕ260 x 50T x 154H SD6000~64000





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Surface Grinding Wheel for Silicon Wafers

General description

Our porous resin bond system has been developed to meet customer's needs of high precision and high grade silicon wafers. This is applicable to the bare wafer polishing as well as wafer backside grinding.

Feature

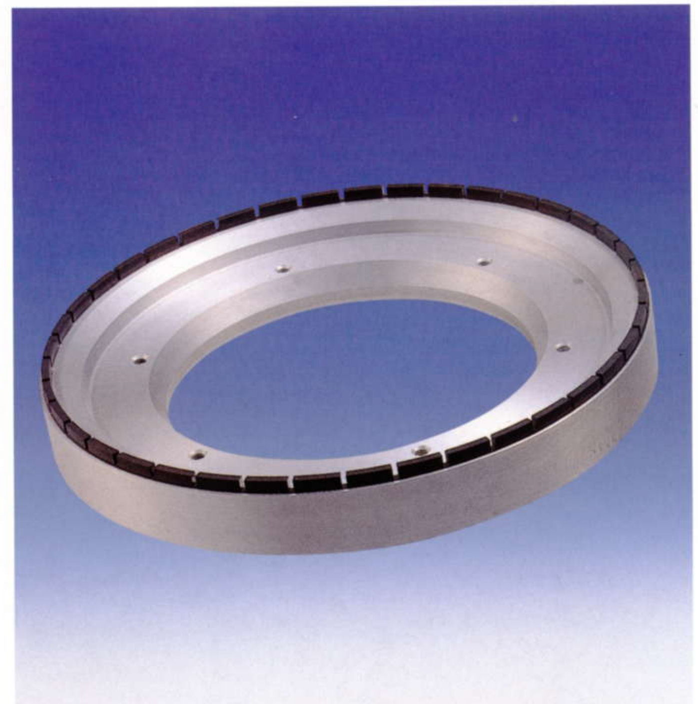
1. The porous resin bond system enables long lasting ability of free cutting.
2. Able to obtain a high grade surface finish by its low elastic modulus.
3. Able to keep a balanced and excellent grinding performance even in high stress and nonstop conditions of processing and rough grinding.
4. In the finishing process it maintains high quality with low damage to the silicon wafer's surface thanks to excellent grinding performance.

Application

1. High grade flat surface grinding of 8" and 12" silicon bare wafers.
2. 8" and 12" silicon wafers backside grinding (rough and fine finish)

Specifications

Standard spec.
For rough finishing: SD325L75BG01 For fine finishing: SD3000J75BG03
Grain size / #325~#3000 Outer diameter / ϕ200~ϕ400 mm
Thickness / 20~40 mm Inner diameter / ϕ150~ϕ300 mm



Beveling Wheel for Silicon Wafers

General description

This product provides a highly precision and high grade finished surface reducing chippings.

Feature

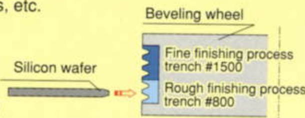
1. High wear resistant metal bond system allows long form retention of the groove.
2. Extremely fine bond system allows high grade finished surface reducing chippings.
3. Customized profile with our high precision EDM technology.
4. Light weight and excellent workability with our aluminum core.

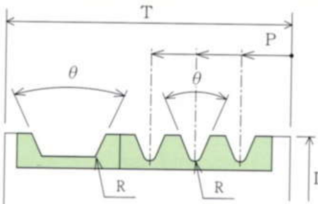
Application

1. Beveling of silicon wafer, compound semiconductor wafer, and sapphire substrate.
2. Chamfering of silicon wafers, compound semiconductor wafers, and sapphire substrates, etc.

Specifications

Standard spec. / SD800 / 1500O100MB01
(Range of manufacturing)
Grain size / SD600~4000 Size / ϕ102~ϕ202





Range of manufacturing of beveling wheel (for outer edge finishing)

Parameter	Size		Tolerance
	MIN	MAX	
θ	10°	–	±30′
R	0.12mm	–	±0.02
P	–	–	±0.05

Beveling Wheel for Silicon Wafers by Helical Scan Grinding

General description

This product is for the helical scan type wafer beveling machines.

Feature

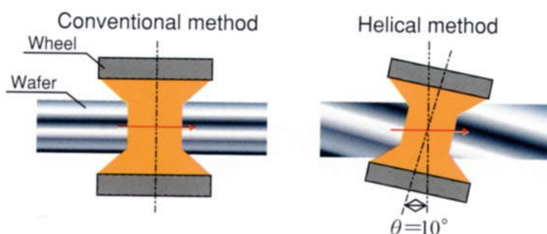
1. Newly developed resin bond system allows high grade process eliminating micro crack and chipping.
2. Superior dressability and high form retention allows consistent high precision process.

Application

1. Beveling of 12" silicon wafers
2. Chamfering of 12" silicon wafers

Specifications

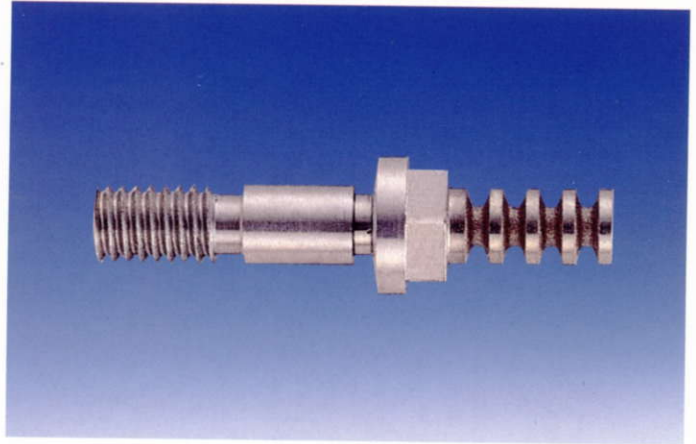
Standard spec. / For outer edge: SD3000P100B x 727
For notch finishing: SD4000T125B x 710 (Range of manufacturing) SD2000~6000
Outer diameter / ϕ50 For V notch finishing / ϕ3.8



Contact area between wheel and wafer increases

Effective number of abrasive particles increases, surface roughness and finishing accuracy are improved.

Beveling Wheel for Notch Grinding of Silicon Wafers



General description

This product adopts a wear resistant bond to address the issue of deformation in chamfering the V-notch of silicon wafers.

Feature

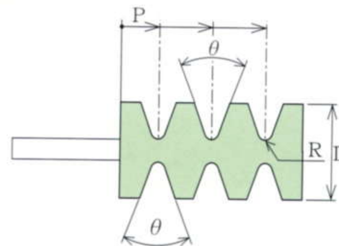
1. High wear resistant metal bond system allows long form retention of the groove.
2. Extremely fine bond system allows high grade finished surface reducing chippings.
3. Customized profile with our high precision EDM technology.
4. Accurate positioning of the wafer by minimized run-out and high precision groove shape.

Application

1. Beveling of V notch of 8" and 12" silicon.
2. Chamfering the V-notch of 8" and 12" silicon wafers

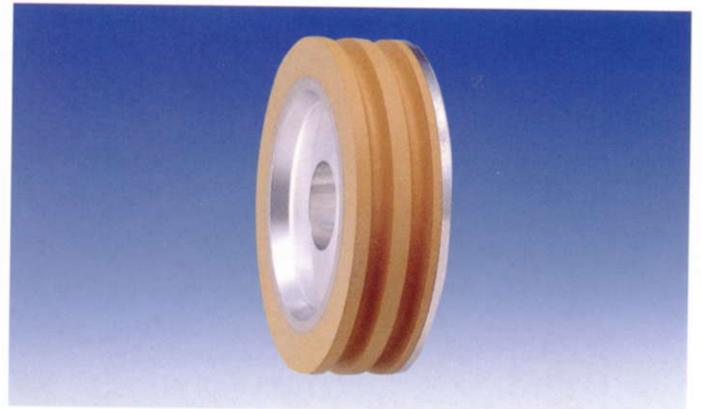
Specifications

Standard spec. / Metallic bond SD800N100M60
(Range of manufacturing) Grain size / SD600~4000 Size / ϕ53.8~ϕ5 mm



Range of manufacturing of beveling wheel (for V-notch finishing)

Parameter	Size		Tolerance
	MIN	MAX	
θ	10°	–	±30′
R	0.12mm	–	±0.02
P	–	–	±0.05



Courtesy of Tosei Engineering Corp.

Single Layered Metal Bonded Pad Conditioner

General description

This product is a single layered metal bonded pad conditioner that is used for high grade flat surface polishing of VLSI wafers.
It's possible to freely control both the amount of protrusion of abrasive grains and the distance between abrasive grains. It has a high durability against acids.

Feature

1. Improved the swarf discharging and the slurry flow with high protrusion and regularly wide grain arrangements.
2. Grains chemically bonded by brazing prevents grain loss.
3. Controlling the amount of protrusion and distance of/between grains makes it possible to stabilize and improve the wafer polishing rate and in surface uniformity.
4. Possible to obtain a balanced conditioning performance by making the height of abrasive grains even.
5. It has high durability against acid and can be used for metallic wiring.

Application

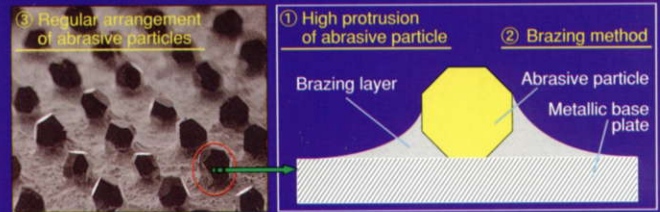
CMP pad conditioning for device wafers (ILD, STI, metallic wiring) and bare wafers

Specifications

Standard spec. / SD100M
(Range of manufacturing) Size / Less than ϕ300

Patented product

Structure of CMP pad conditioner with tightly bonded single layer abrasive particles



CMP Pad Conditioner (Electroplated)

General description

This product is a pad conditioner used for high grade flat surface polishing of VLSI wafers.
It's possible to make a scratch free conditioning by setting the distance between abrasive grains wider and by arranging them more uniformly than the conventional products.

Feature

1. By widening the distance between the abrasive grains and inhibiting grains from coming out of the abrasive layer, generation of wafer scratch is suppressed. As a counter measure against micro-scratch, selected abrasive grains have no micro crack.
2. Ability to improve polish rate, in-surface uniformity and stability of polishing owing to regularly arranged abrasive grains.
3. Prevent loading by widening the distance between abrasive grains and improve the life of the conditioner.

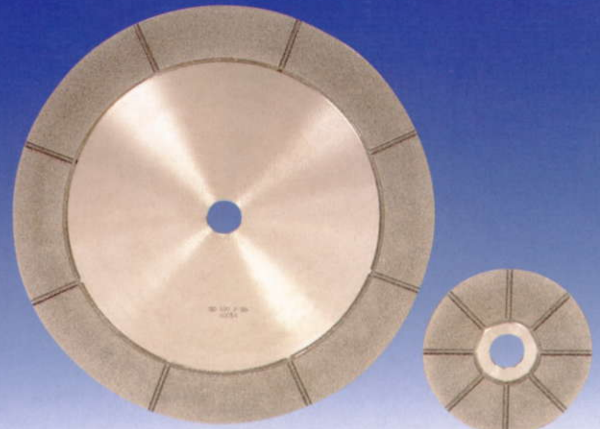
Application

CMP pad conditioning for bare wafers and device wafers (ILD, STI)

Specifications

Standard spec. / SD100VPC6S
(Range of manufacturing) Size / Less than ϕ300

Patent pending



CMP Pad Conditioner (Ceramic Bonded)

General description

This product is an ideal pad conditioner to be used for bare wafers. By applying ceramics to the parts at which the pad and slurry contact each other, metallic contamination can be eliminated.

Feature

1. No acid related problems since the ceramic can not be dissolved by acid.
2. The diamond grains are arranged uniformaly.
3. Free to control the distance between the diamond grains and height of grain protrusion.
4. Stable conditioning performance with even grain height.

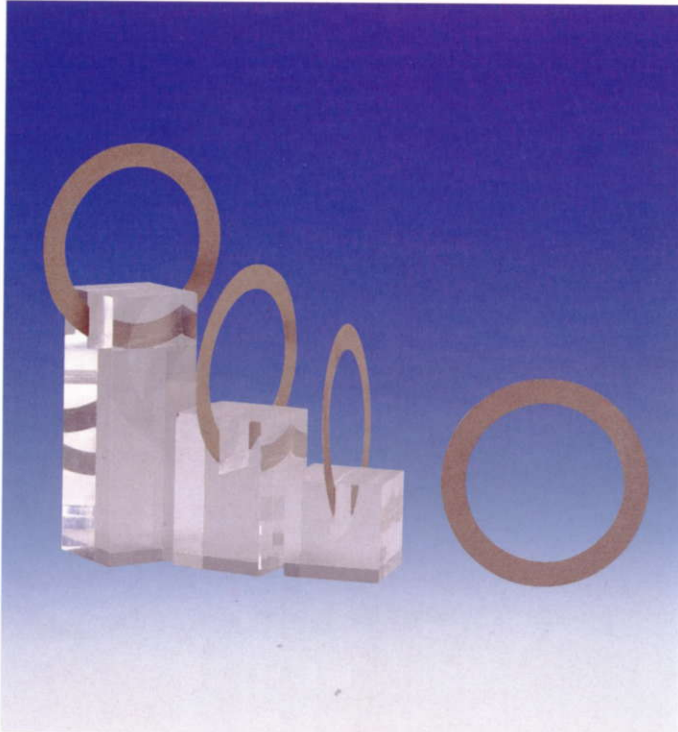
Application

CMP pad conditioning for bare wafers

Specifications

Standard spec. / SD100V É"20 x 2T
(Range of manufacturing) Size / Less than ϕ120

High Rigid Metal Bonded Cutting Blade "Clear Edger"



General description

This product is a highly rigid, metal bonded, extremely thin cutting blade specially developed for cutting CSP (Chip Scale Package).

Feature

1. Possible to obtain superior straightness of the cutting plane in high speed cutting operations owing to its high rigidity.
2. Since the amount of the side protrusion of abrasive particles is large with a superior cutting performance, plugging by scrapes is greatly reduced.
3. Since the height of the protrusion of abrasive grains is uniform owing to the Noritake's unique and special finishing technology, it's possible to obtain a high grade cutting surface with few burrs.

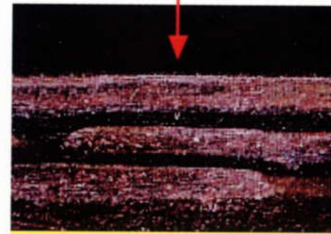
Application

1. Cutting plastic packages
2. High precision cutting of BGA and CSP

Specifications

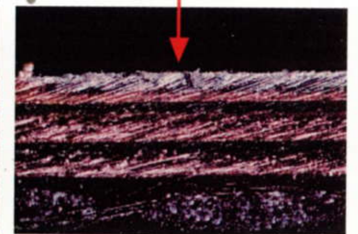
Standard spec. / SD400V100MM1 ϕ55 x 0.15T x 40H
SD230~800 Size / ϕ50.8~ϕ76.2 Thickness / 0.15~0.30mm
Inner Circle diameter / ϕ25.4 ϕ40 Slit / Number 4~42
Possible to form slits with width of 1~2 mm and depth of 1~3 mm

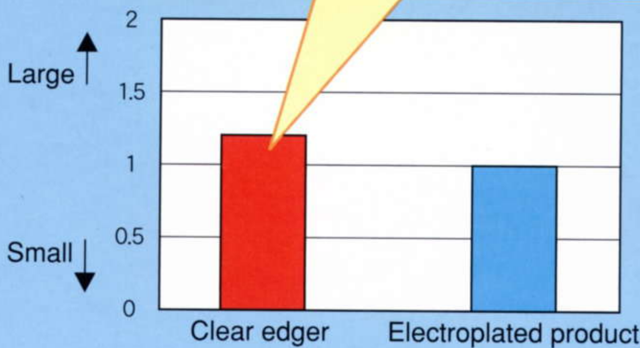
Cu part is clear



Edge is clear

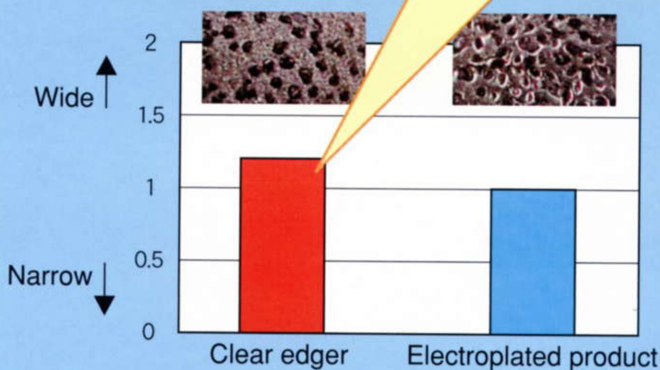
Burr is generated in Cu part





Less friction on work material and blade surface

Improve cutting surface finish



Wide range of abrasive concentration available

Maintain superior cutting performance

Attention:Those rates may change due to condition and are not to guarantee the efficiency of performance