



BACK GRINDING WHEEL



Advantages

- 1) Rough grinding (Z1)
 1. Vitrified bond (#400~800)
 - ① Higher feed rate for better UPH.
 - ② Low and consistent grinding current and longer wheel life time
 2. Resin bond (#325~600)
 - ① Less edge chipping and grinding damage on thin wafer
 - ② Excellent grinding ability without compromising wheel life time
- 2) Fine grinding (Z2)
 1. Resin bond (#2000 ~ #4000)
 - ① Easy grinding with low and consistent grinding current
 - ② Considerably longer life time than competitor's
 - ③ #3000~#4000 : Superior surface roughness and minimized sawing mark

Specifications

Applications	D	W	X	Mesh size	Bond name
Rough grinding	Ø200 ~ Ø204	2~4	5~7	#270	VA
	Ø250			#325	VCL
Fine grinding	Ø300 ~ Ø304			#400	RB
				#600	RS
				#800	REC
				#1200	RDC
				#1500	SWB
				#2000	SWA
				#3000	SWC
				#4000	SWD
					SWE

Bond type		Machine, S/K type		Dimensions	
Resin	BG01	DISCO	D	D	Diameter
		OKAMOTO	O	W	Width
Vitrified	BG02	TSK	T	X	Depth



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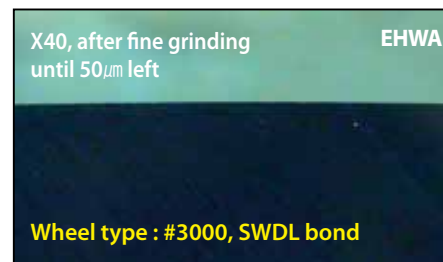
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Performance Data

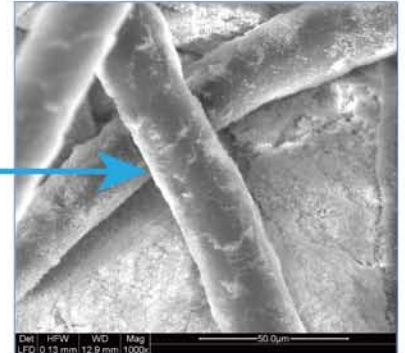
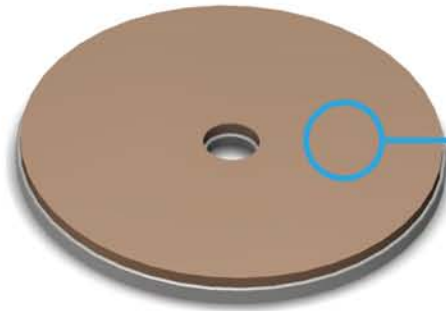
Performance comparison : Z1		EHWA : RSL		Competitor	
Specification	Bond type	Porous structured resin		Porous structured resin	
	Mesh size	#400 ~ #600		#320	
Machine		DISCO 8760	TSK PG300	DISCO 8760	TSK PG300
Grinding ability [Max grinding current, normal feed, A]		Around 12 ~ 13	9 ~ 10A	Around 13 ~ 14	10 ~ 11A
Life time [Wafers / wheel]		Around : 18K	Around 12K	Around : 13K	Around 10K
Roughness [Rmax, μ m]		Around 3 ~ 4		Around 4 ~ 5	

Performance comparison : Z2		EHWA : SWD		Competitor	
Specification	Bond type	Wear resistant porous structured resin		Porous structured resin	
	Mesh size	#2000 ~ #3000		#2000	
Machine		DISCO 8760	TSK PG300	DISCO 8760	TSK PG300
Grinding performance [Max grinding current, normal feed, A]		Around 12 ~ 13A	9 ~ 10A	Around 13 ~ 14	10 ~ 11A
Life time [Wafers / wheel]		Around : 18K	Around 12K	Around 12K~20K	Around 12K
Roughness [Ra, nm]		Around 7 ~ 8		Around 7 ~ 8	

· Wafer edge shape for ultra thin wafer



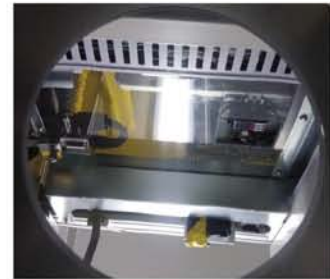
DRY POLISHING WHEEL (DP)



Wool Felt + ZrO₂ (250 nm)

Work Piece & Grinding

Silicon Wafer



- Z1 : EHWA BACK GRINDING WHEEL
- Z2 : EHWA BACK GRINDING WHEEL
- Z3 : EHWA DP-350D

Roughness Result (EHWA)

WAFER ROUGHNESS TEST (Field test)

- Sampling Interval : 1.0um
- Objective : 20X
- Cutoff Filter : 80.00 (um)
- Machine : MP2000+

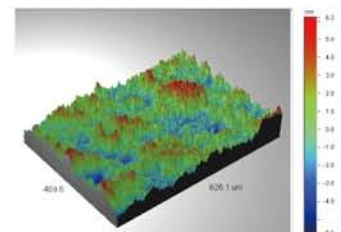
TOTAL ROUGHNESS AVERAGE

Ra Average = 1.64 Å



WAFER ROUGHNESS TEST (In house test)

- Ra : 1.17nm
- Rq : 1.48nm
- Rt : 11.97nm
- Machine : Wyko NT3300
- Method : Optical 3D Surface



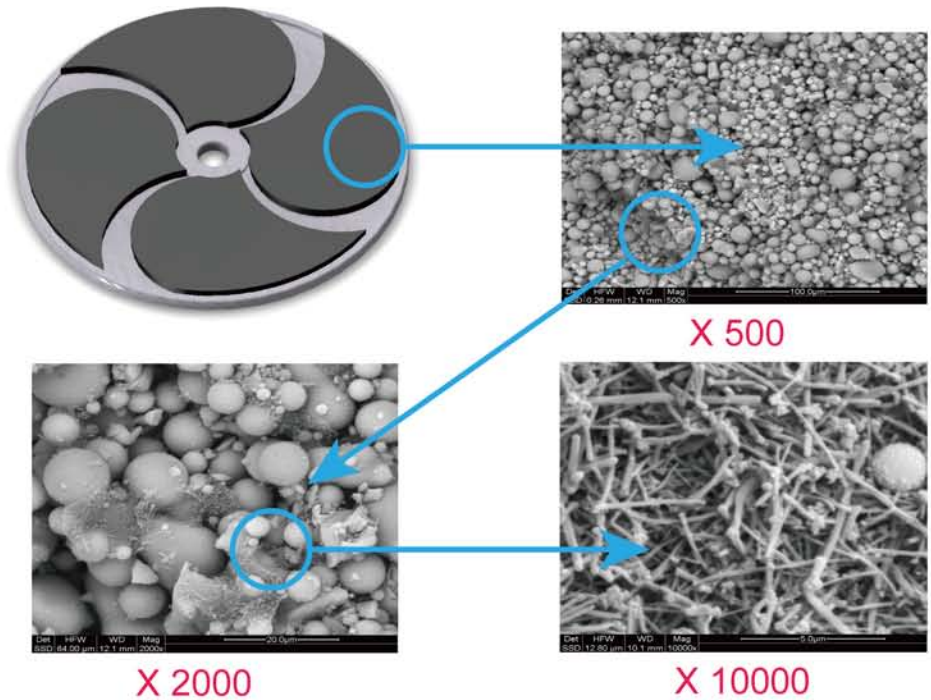
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GDP WHEEL



Test Condition

EHWA GDP(Sample1) Wheel Test

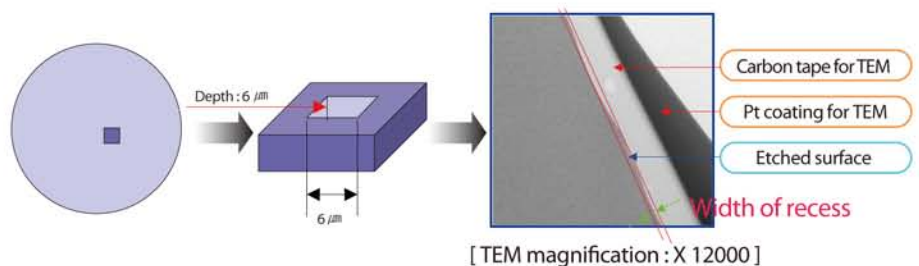
Processed Material

- Silicon Wafer Size : 12inch
- BG Tape Type : Lintec P-7180(180um)
- Machine Type : DGP 8761(NN2412) & DFM2800
- Quantity : Dummy Wafer x10 pcs

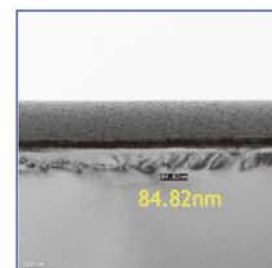
Wheel Type

- Z1 : EHWA BACK GRINDING WHEEL
- Z2 : EHWA BACK GRINDING WHEEL
- Z3 : EHWA-GDP 450D-26T-130H

Roughness Result (EHWA)



Damage depth



Damage depth

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METAL EDGE GRINDING WHEEL



Advantages

- Various groove shapes can be designed.
- Grinded with uniform chamfer width (excellent rigidity)
- Strong groove shape retention.
- Product 1ea enables multi-stage grinding (rough / fine grinding)

Application

- LCD & OLED Panel, glass edge grinding

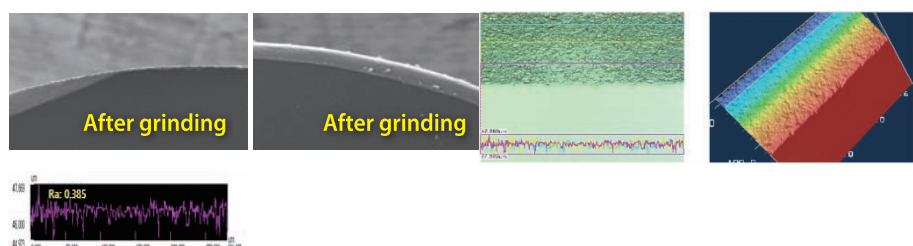


Available Product Spec.

Type	Diameter	Thickness	Grit Size	Groove
MD-DW	Φ5 ~ Φ50	5 ~ 20mm	#325 ~ #2000	Metal
MD-1FF6Y	Φ50 ~ Φ200	5 ~ 80mm		

Performance Data

Applicaton	Edge Strength	Life Time	Chipping Size
15" Panel grinding	120~130 (Mpa)	100 (cell/groove)	< 30μm



EHWA DIAMOND
SEMICONDUCTOR / DISPLAY / SOLAR & LED



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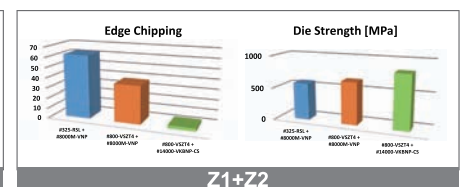
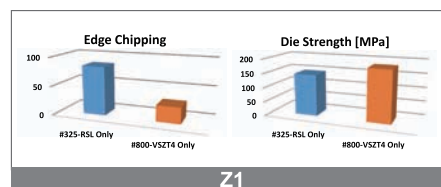
VITRIFIED BACK GRINDING WHEEL (NANO POL)



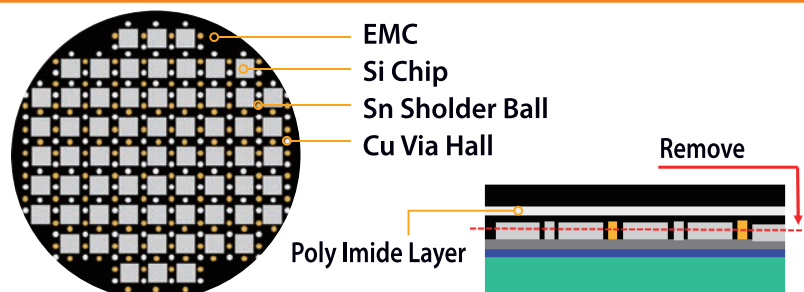
Technology

- Wafer surface roughness and die strength can be improved
- Grinding stress and wafer edge chipping can be reduced
- Diamond at the tip can be distributed consistently
- Porosity, pore shape and pore size control can be adjusted
- Possible to grind Si wafer up to 17 μ m (Ultra thin wafer)
- Outstanding grinding ability for TSV and normal(for finger print) compound wafer

Si Wafer Grinding Wheel



Compound Material (Finger Print Strip) & Compound Molded Wafer (TSV/Fan-Out) Grinding Wheel



Material	Wheel Spec.
Pure Compound(Ex. EMC)	#800 ~ #2000 VSP3, #800 ~ #2000 VSP5
Compound + Silicon Chip	Z1 #800 VSP3 + Z2 #5000VK8HS, Z1 #800 VSP3 + Z2 #5000VK8B
Compound + Silicon Chip + Copper Via	Z1 #800 VSP3 + Z2 #5000VK8HS, Z1 #800 VSP3 + Z2 #5000VK8B
Compound + Silicon Chip + Copper Via + Polyimide + Solder	Z1 #800 VSP3 + #3000 VSPS10, Z1 #800 VSP3 + #3000 VSPBT7

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MICRO BLADE



Advantages

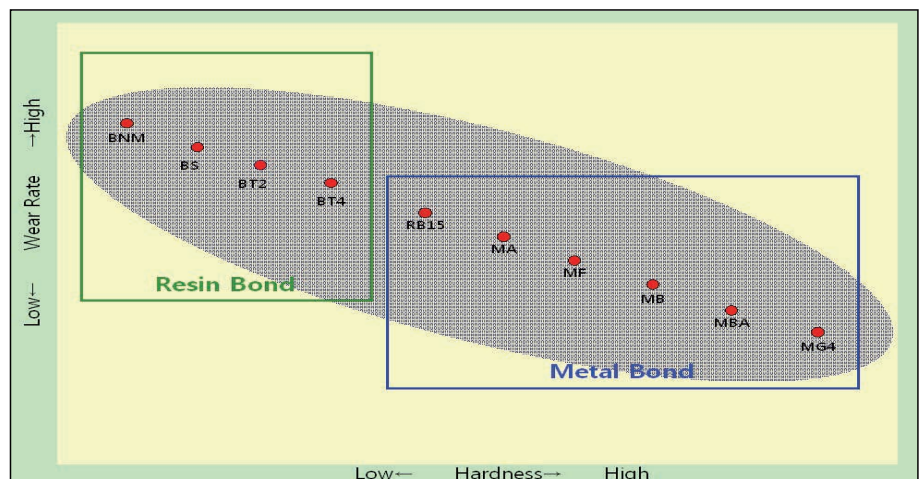
- High precision thin with superior cutting efficiency
- Maintains free cutting action at high RPM and fast feed rates
- Eliminate chipping during the sawing operation

Applications

- Sawing of packages such as QFN, FBGA, CSP, MCP, POP, PBGA
- Sawing and grooving of Ferrite, Ceramics, Glass, Quartz, Sapphire

Available Product Spec and Bond Series

Out Diameter	Minimum Thickness(mm)		
	Metal Bond	Resin Bond	Electroformed Bond
52~60 mm (2.5 inch)	0.10	0.10	0.08
75~78 (3inch)	0.15	0.15	
100~115 (4 inch)	0.15	0.20	
120~130 (5 inch)	0.20	0.25	



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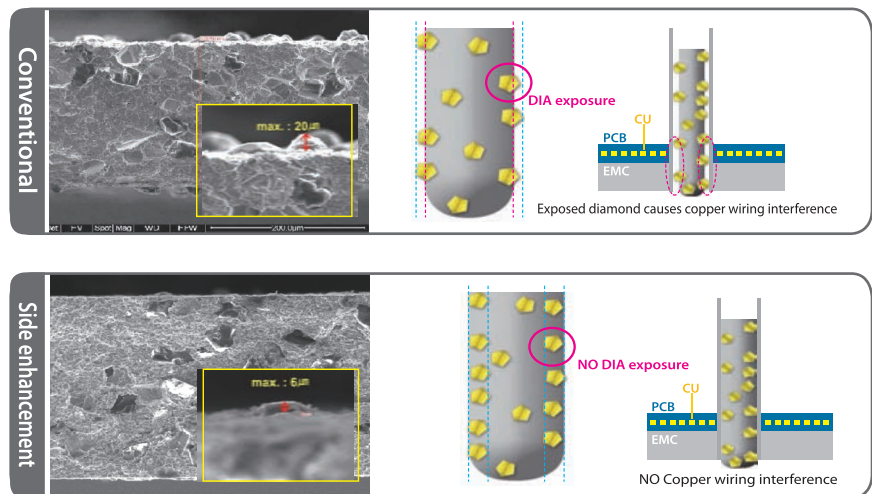
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Elements of Blade Structure

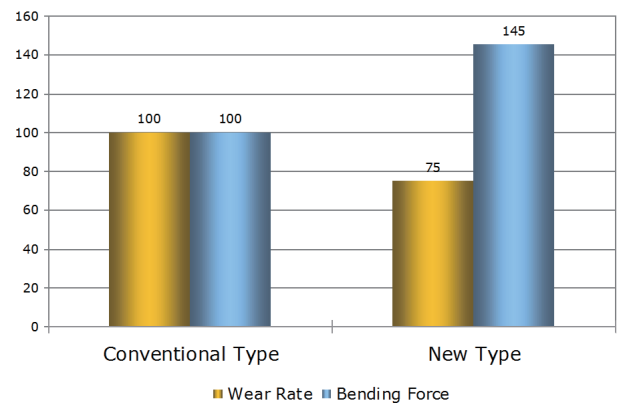
BNM Series	BS Series	BT Series	RB 15	MB 15	MF	MA	MB Series	MPQ2	MBA	MG4		
Resin type			Metal type									
Hardness												
Glass / Quartz / Ceramic						LTCC						
						FBFA / CSP / LED						
						QFN				CABGA		
											LED / MLF	
Electroforming type		Metal(Ni)		Hardness (Metal, Resin<)		Si, GaAs, amd PKG(Tape-CSP) cutting						

EHWA New Blade

- No diamond exposure of blade surface type
- Excellent cutting quality at Cu burr, Chipping and shape maintaining
- Superior blade life time and hardness than conventional blade



Cutting surface of the PKG



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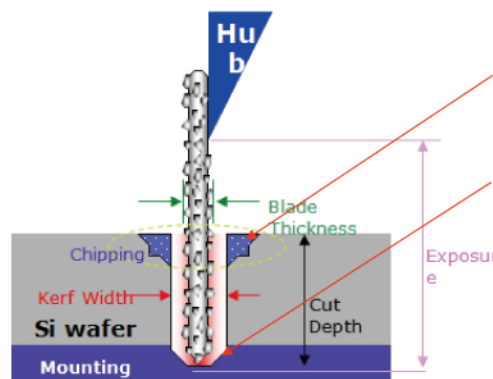
DICING BLADE



Advantages

- High accuracy, super thin blade developed by EHWA's cutting
- Minimized chipping and superior consistence in quality through stringent particle
- Size distribution control
- Improve productivity by high feed speed
- Providing an optimized solution to the customers

Si Wafer Dicing Mechanism



Wafer Top Side : Wet Cutting with Coolant
In general, fine diamond grit leads to small top side chipping.

Wafer Back Side : Dry Cutting without Coolant
In general, coarse diamond grit minimizes back size chipping due to its cutting ability and less load imposed on each grit.

Developing New Bond

Application

Si and Compound semiconductor

Features

Small top and backside chipping
Improve productivity by high feed speed



Top chipping



Side & back chipping

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Electroformed Micro Blade

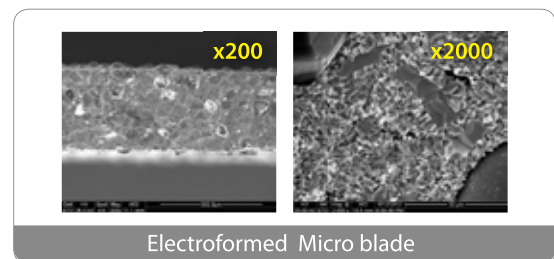
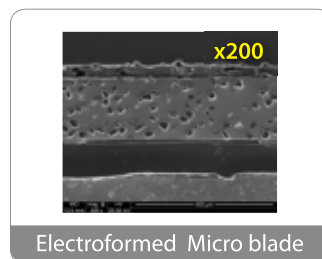


Features

- High accuracy
- Ultra-thin hub-less blade (~50um) vs Metal bond micro blade (>100um)
- Cutting any hard materials (ex Ceramic package, LTCC, HTCC)
- Advantages of cutting PKG with high abrasive content
- High yield long life time

Bonding Strength

- High bonding strength → long life time
- No pore in Ni bond microstructure



Specification

- Thickness : >50um
- Outer diameter : >54mm
- Diamond concentration : 25~100con

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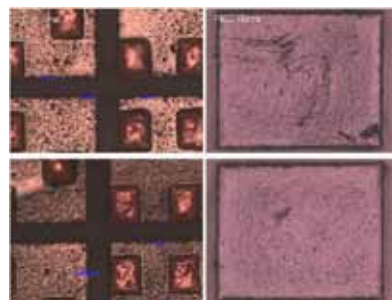
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Application

Application which requires thin kerf & long life time.

- Ceramic package (HTCC, LTCC)
- LED package
- PCB
- Etc.

Ceramic Package Cutting



Chipping Size : 10~20 μ m (Max 27 μ m)