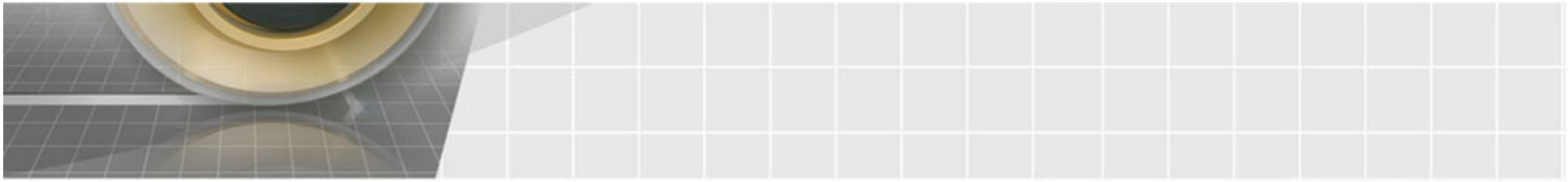

Dressing Requirements & Instructions per Application

ADT = Dicing
Advanced Dicing Technologies

Recommended Dressing per Application

General:

Substrate matrices and quality requirements may vary and be different from customer to customer.

The ADT recommended dressing procedures are general / generic recommendations based on years of experience in the market place. They are a good starting point for each application.

Final optimization of the dressing procedure should be performed at the customer site in a production mode

ADT = Dicing
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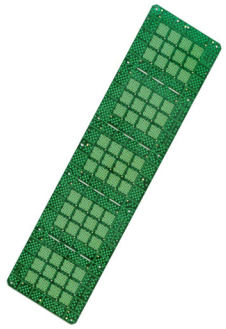
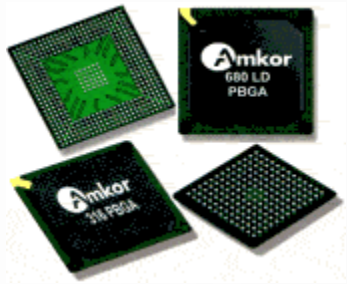
Recommended Dressing per Application

Application - Plastic BGA



Most BGA type applications require no specific dressing.
Customers are starting to dice on production wafers, some at top production feed rate and some by an override process.

Blade Used – For tape mounting – Metal Sintered – ADT Matrices –95, 29, 62, 02
For tapeless mounting – Metal Sintered – ADT Matrix 42



Override recommendation:
Override media – Production BGA substrate

Recommended override parameters:-
Spindle speed – Production speed 30-40Krpm
Feed rate – Start at 10mm/sec going up by 5mm/sec increments, making 5x cuts at each feed rate, going up to production speed.
Cut depth – Use production depth
Index – Use substrate index

Note – Perform height only after the dressing / override process is completed

ADT = Dicing
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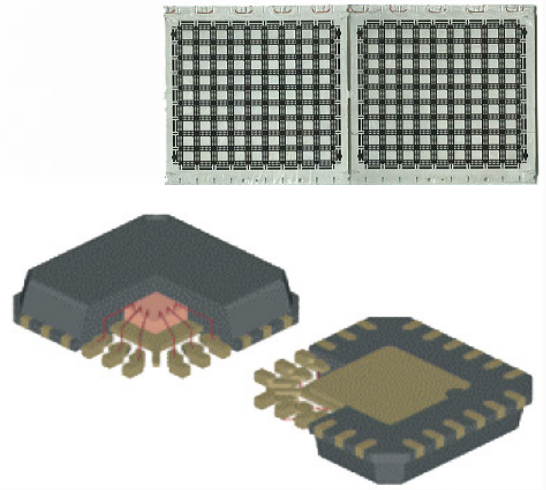
Application - QFN – H.E. – Lead / Tin (Matte) (Pb / Sn) coating

Blade used – Resin –E- & -T-series
Dressing media – Silicon Carbide – 320 mesh
Dressing media geometry – 90 x 25 x 3mm
Dressing media P/N – 00767-0320-003

Dressing parameters	Process	
	2”	3”
Spindle speed – (Krpm)	22	15
Feed rate – mm/sec	10 / 10x cuts	10 / 10x cuts
	20 / 5x cuts	20 / 5x cuts
	40 / 5x cuts	40 / 5x cuts
	60 / 5x cuts	60 / 5x cuts
	80 / 5x cuts	80 / 5x cuts
Cut depth – (mm)	Production + 0.2	Production + 0.2
Cut length – (Meters)	~1-1.5	~1-1.5
Index –	2x blade Thick.	2x blade Thick.



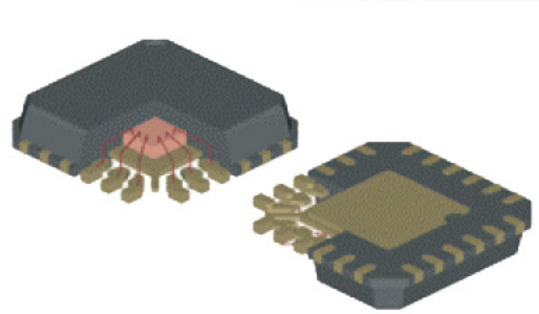
Note – Perform height only after the dressing process is completed

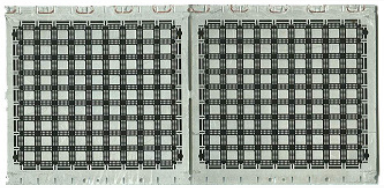
ADT = Dicing
Advanced Dicing Technologies

Application - QFN – H.E. – Nickel Palladium (Ni / Pd) coating

Blade used – Resin –E- & -T- series
Dressing media – Silicon Carbide – 320 mesh
Dressing media geometry – 90 x 25 x 3mm
Dressing media P/N – 00767-0320-003

Dressing parameters	Process	
	2”	3”
Spindle speed – (Krpm)	22	15
Feed rate – mm/sec	10 / 10x cuts	10 / 10x cuts
	20 / 5x cuts	20 / 5x cuts
	40 / 5x cuts	40 / 5x cuts
	60 / 5x cuts	60 / 5x cuts
	80 / 5x cuts	80 / 5x cuts
Cut depth – (mm)	Production + 0.2	Production + 0.2
Cut length – (Meters)	~1-1.5	~1-1.5
Index –	2x blade Thick.	2x blade Thick.





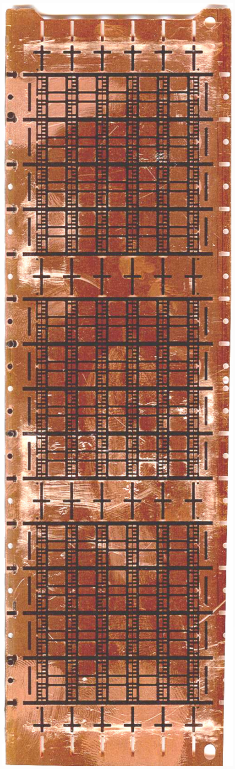
Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

Application – Power QFN

Blade used – Resin –E- series
Dressing media – Silicon Carbide – 320 mesh
Dressing media geometry – 90 x 25 x 5mm
Dressing media P/N – 00767-0320-005

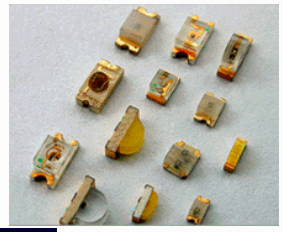
Dressing parameters	Process
	3”
Spindle speed – (Krpm)	12-16
Feed rate – mm/sec	10 / 10x cuts
	20 / 10x cuts
	40 / 10x cuts
Cut depth – (mm)	Production + 0.2
Cut length – (Meters)	~1-1.5
Index –	2x blade Thick.



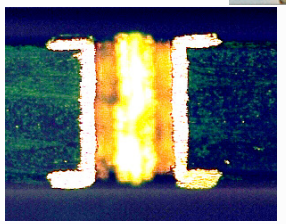
Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

Application – PCB (LED Packages)



Blade used – Nickel Serrated, 2” O.D. x “T”, “V” & “Z” matrices
x 10, 13, & 17mic. Grit x .003”-.008” thick



Dressing media – Green Silicon Car. 600mesh
Dressing media geometry - 90 x 25 x 2mm or 3mm
Dressing media P/N – 767-0600-002 or -003

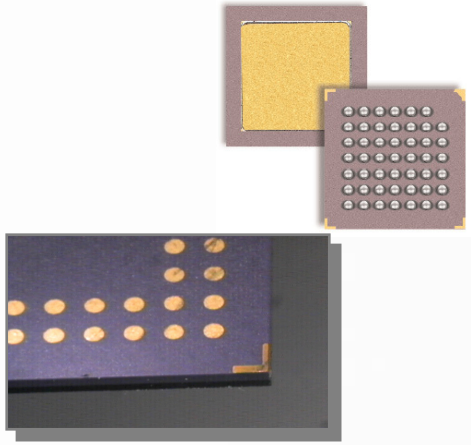
Dressing parameters:-	Process
Spindle speed –	25-35Krpm
Feed rate –	10mm/sec 3x cuts, 20mm/sec 3x cuts, 40mm/sec 3x cuts 60mm/sec 3x cuts, 80mm/sec 3x cuts, 100mm/sec 3cuts
Cut depth -	Production + 0.2mm
Cut length –	~0.5meter
Index –	2x blade Thick.

Note – Perform height only after the dressing process is complete

ADT = Dicing
Advanced Dicing Technologies

Application – Ceramic BGA

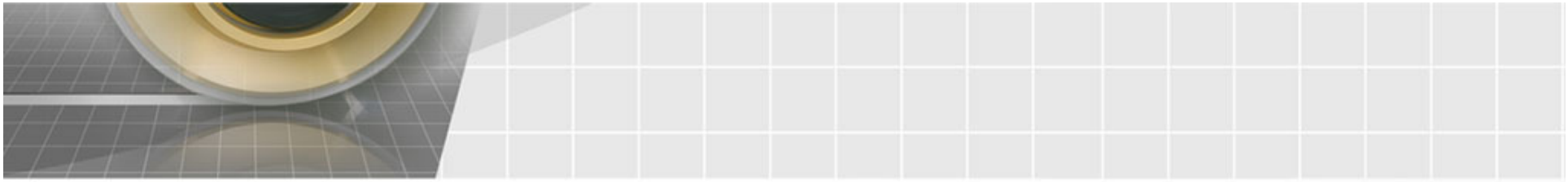
Blade used - Resin, 2” or 4” O.D. X Matrices K or R x
45 – 75mic diamond grit x .006” - .020” thick
Dressing media – Green Silicon Car. 600mesh
Dressing media geometry - 90 x 25 x 2mm or 3mm
Dressing media P/N – 767-0600-002 or -003



Dressing parameters:-	2” O.D.	4” O.D.
Spindle speed –	25 – 30Krpm	8 – 12Krpm
Feed rate –	2mm/sec 2x cuts, 4mm/sec 2x cuts, 6mm/sec 2x cuts 8mm/sec 2x cuts, 10mm/sec 2x cuts	
Cut depth -	Production + 0.2mm	
Cut length –	250mm	
Index –	Blade thickness x 2	

Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies



Glass Applications general:

The market faces many glass applications with different thickness and material variations.

The following are general dressing recommendations. For special glass coatings or surface finishes consult the factory.

Glass up to 1mm thick can be diced with both resin & metal Sintered blades. Glass over 1mm we recommend to use resin type blades.

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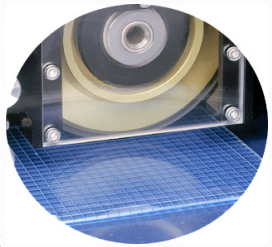
Application – Glass using resinoid blades



Blade used – Resin Matrices QUP, QKP & QIP x 2", 3" & 4" O.D
15-45mic. diamond grit x .003" - .020" thick
Dressing media – Green Silicon Car. 600mesh – 320 for grits over 30mic
Dressing media geometry - 90 x 25 x 2mm or 3mm or 5mm
Dressing media P/N – 767-0600-002 or -003 or – 005
767-0320-003 or -005 - for over 30mic grit

Dressing parameters:-	Glass thickness range							
	Up to 0.5mm		0.5 to 1mm		1 – 2mm		2 – 4mm	
Spindle Dia.	2"	4"	2"	4"	2"	4"	2"	4"
Spindle speed – Krpm	20-30	8-12	20-30	8-12	18-25	8-12	18-25	8-12
Feed rate – mm/sec, cut / F.R	2, 4, 6 x 2 cuts		2, 4 ,6 x 2 cuts		2, 4, 6, x 2 cuts		1, 2, 3, 4, 5, 2 cuts	
Cut depth -	Pro. Sub.+0.2mm		Pro. Sub.+0.2mm		Pro. Sub.+0.2mm		Pro. Sub.+0.2mm	
Index –	Blade thick. x 2		Blade thick. x 2		Blade thick. x 2		Blade thick. x 2	

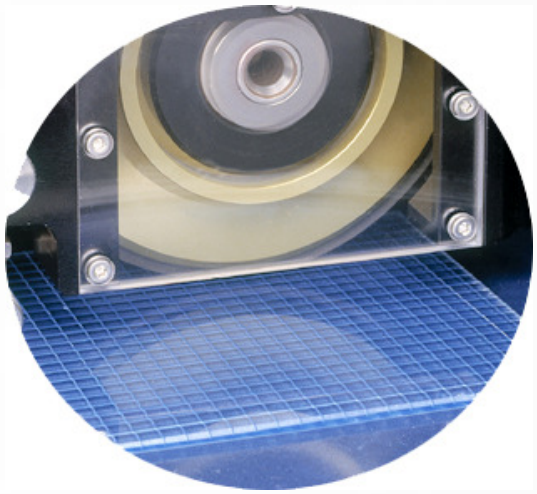
Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

Application – Glass using metal sintered blades

Blade used – Sintered matrices –M55, -M96 x 2" O.D.
10, 13, 17, 25, 30mic. diamond grit x .003" - .010" thick
Dressing media – Green Silicon Car. 600mesh
Dressing media geometry - 90 x 25 x 2mm or 3mm or 5mm
Dressing media P/N – 767-0600-002 or -003 or – 005

Dressing parameters:-	Glass thickness range	
	Up to 0.5mm	0.5 to 1mm
Spindle Dia.	2"	2"
Spindle speed – Krpm	20	20
Feed rate – mm/sec, cut / F.R	2,3,4,5, 6 x 2 cuts	2, 4, 5, 6 x 2 cuts
Cut depth -	Pro. Sub.+0.2mm	Pro. Sub.+0.2mm
Index –	Blade thick. x 2	Blade thick. x 2

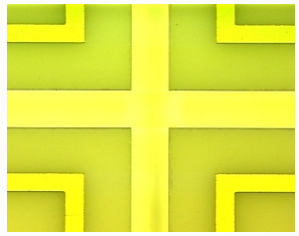


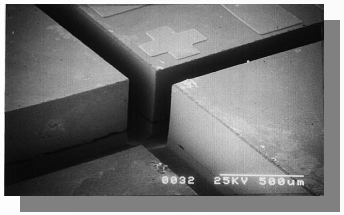
Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

Application – Hard Alumina

Blade used – Resin Matrices KUP, RUP x 2”, & 4” O.D
45 - 88mic. diamond grit x .006” - .020” thick
Dressing media – Green Silicon Car. 320mesh
Dressing media geometry - 90 x 25 x 2mm or 3mm or 5mm
Dressing media P/N – 767-0320-002 or -003 or – 005





Dressing parameters:-	Glass thickness range							
	Up to 0.5mm		0.5 to 1mm		1 – 2mm		2 – 4mm	
Spindle Dia.	2”	4”	2”	4”	2”	4”	2”	4”
Spindle speed – Krpm	18-30	8-12	18-30	8-12	18-30	8-12	18-30	8-12
Feed rate – mm/sec,	2, 4, 6, 8 x 2 cuts		2, 4 ,6, 8 x 2 cuts		2, 4, 6, 8 x 2 cuts		2, 4, 6, 8 x 2 cuts	
Cut depth - cut / F.R	Pro. Sub.+0.2mm		Pro. Sub.+0.2mm		Pro. Sub.+0.2mm		Pro. Sub.+0.2mm	
Index –	Blade thick. x 2		Blade thick. x 2		Blade thick. x 2		Blade thick. x 2	

Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

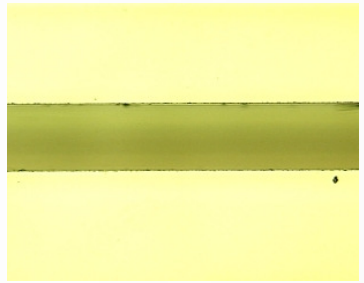
Application – Quartz (SAW filters others)

Blade used – Resinoid 2” – Matrices KUP, QUP x 30-45mic. grit x .006” - .012” thick

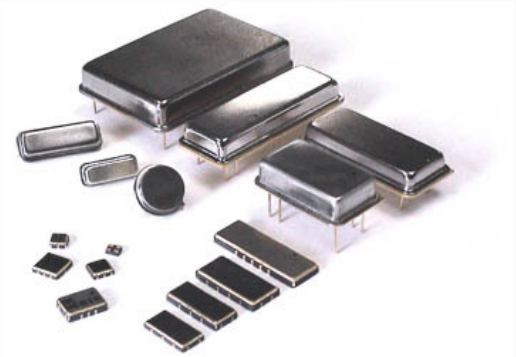
Dressing media – Green Silicon Car. 600mesh

Dressing media geometry - 90 x 25 x 2mm or 3mm

Dressing media P/N – 767-0600-002 or -003

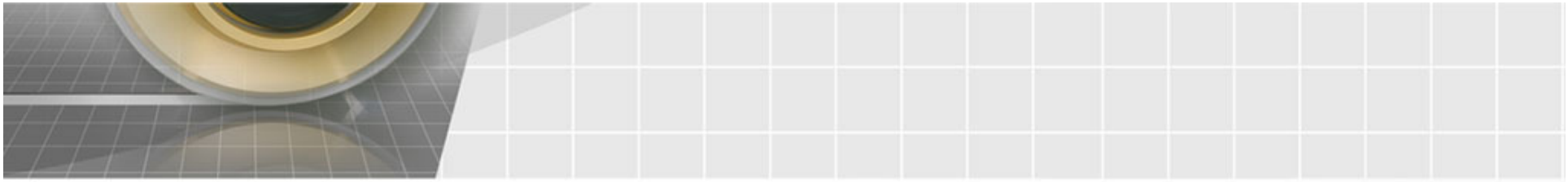


Dressing parameters:-	Quartz thickness range	
	0.2 - 0.5mm	0.5 to 1mm
Spindle Dia.	2”	2”
Spindle speed – Krpm	18 - 20	20 - 22
Feed rate – mm/sec, X cuts / F.R	1, 2, 3, 4, 5, x 2 cuts	1, 2, 4, 5, x 2 cuts
Cut depth -	Pro. Sub.+0.2mm	Pro. Sub.+0.2mm
Index –	Blade thick. x 2	Blade thick. x 2



Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies



Application – LiNb03 & LiTa03

Blade used - Nickel 2" O.D. x 3-6 & 4-8mic. Grit x .002"-.003" thick
- Resinoid 2" – Matrices QUP, QKP & KUP x 15 & 20mic. grit x .003" - .006" thick

Dressing media – For Nickel – Silicon carbide (Dark) – 600 mesh
For Resinoid - Green Silicon Car. 600mesh

Dressing media geometry - Ni. - 75 x 75 x 1mm, Resin - 90 x 25 x 2mm or 3mm

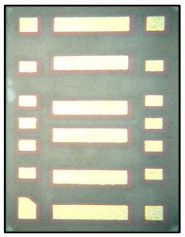
Dressing media P/N – Ni. – 767-0000-001, Resin 767-0600-002 or -003

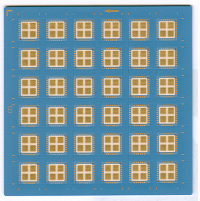
Dressing parameters:-	Nickel	Resinoid
Substrate thickness	0.2 - 1mm	0.2 - 2mm
Spindle Dia.	2"	2"
Spindle speed – Krpm	30Krpm	25-30Krpm
Feed rate – mm/sec, cut / F.R	2 x 10 cuts, 5x5 cuts & 8 x 1cut	2 x 2 cuts, 4 x 2 cuts, 8 x 2cuts
Cut depth -	.002" .005" Pr.+ 0.2mm	Production + 0.2mm
Index –	Blade thick. x 2	Blade thick. x 2

Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies

Application – LTCC





Blade used – Sintered 2” O.D. Matrices M94 & M50 x 15 - 35mic. Grit x .002”-.003”thick

Resinoid 2” – Matrices QUP, QKP & KUP x 35-53mic. grit x .006” - .008” thick

Dressing media – For Sintered – Green Silicon carbide 600 mesh

- For Resinoid - Green Silicon Car. 320 mesh

Dressing media geometry - 90 x 25 x 2mm or 3mm

Dressing media P/N – Sintered - 767-0600-002 or -003, Resin 767-0320-002 or -003

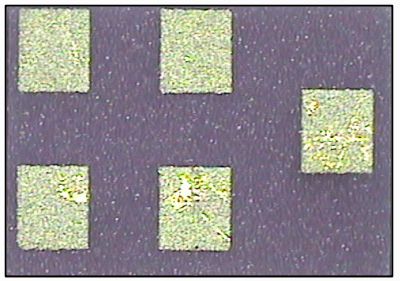
Dressing parameters:-	M. Sintered	Resinoid
Substrate thickness	0.2 - 2mm	0.5 - 2mm
Spindle Dia.	2”	2”
Spindle speed – Krpm	32-38	28-30
Feed rate – mm/sec,	2 x10cuts, 4x5cuts & 6x 5cuts	5 x 5 cuts, 8 x5 cuts & 5 x 1cut
Cut depth - cut / F.R	Pro. Sub.+0.2mm	.002” .005” Pr.+ 0.2mm
Index –	Blade thick. x 2	Blade thick. x 2

Note – Perform height only after the dressing process is completed

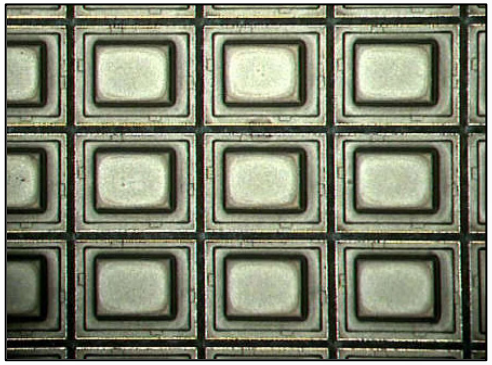
ADT = Dicing
Advanced Dicing Technologies

Application – HTCC

Blade used – Sintered – 2“ O.D. Matrices M94 & M50 x 35-50mic. Grit
x .005” - .008” thick
Dressing media – Green Silicon Carbide – 320 mesh
Dressing media geometry – 90 x 25 x 2 or 3mm
Dressing media P/N – 00767-0320-002 or - 003

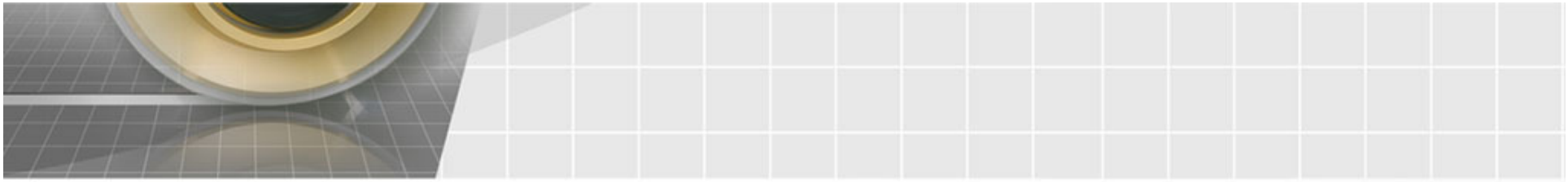


Dressing parameters	Process
Spindle speed –	20-30Krpm
Feed rate – mm/sec	5, 10, 15, 20, 25, 30 x 4 cuts per F.R.
Cut depth – (mm)	Production + 0.2mm
Cut length – (Meters)	0.6 meter
Index –	Blade thickness x 2



Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies



Application – Silicon wafers

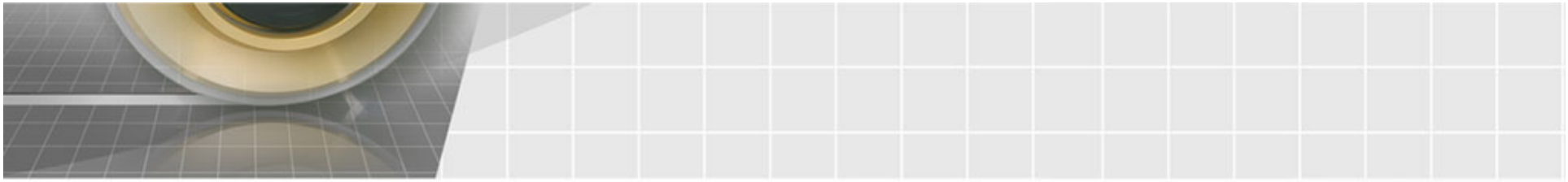
Blade used – Nickel (Annular) 2” O.D. x 2-4, 3-6, 4-6mic. x .0012”-.002” thick
Dressing media – Silicon Carbide (Dark) 600 mesh
Dressing media geometry – 75 x 75 x 1mm
Dressing media P/N – 767-0000-001

Dressing parameters:-	Step # 1	Step # 2	Step # 3	Step # 4
Spindle speed –	35-45Krpm	35-45Krpm	35-45Krpm	35-45Krpm
Feed rate – inch/sec	6”	.2”	.5”	On blank Sil. wafer Start at .1”, cont. at .2” steps up to pro. speed depending on cut quality✦
Cut depth -	.002”	Production + .002”	Production + .002”	
Cut length –	10 x 75=750mm	10 x 75=750mm	10 x 75=750mm	
Index –	Blade Thick. X 2	Blade Thick. X 2	Blade Thick. X 2	Blade Thick. X 2

✦ Cut depth = production depth + .001”

Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies



Application – Silicon on Glass

Blade used – Resin – 2” O.D. x matrices QUP & QKP x 25-35mic. Grit x .006”-.010” thick

Dressing media – Silicon Carbide – 600 mesh

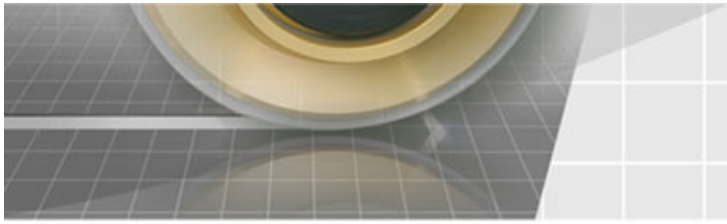
Dressing media geometry – 90 x 25 x 3 or 5mm

Dressing media P/N – 00767-0600-003 or -005

Dressing parameters	Process
Spindle speed – (Krpm)	25-30
Feed rate – mm/sec	1 x 2 cuts, 2 x 2 cuts 3 x 2 cuts, 5 x 2 cuts
Cut depth – (mm)	Production + 0.2mm
Cut length –	100mm
Index –	Blade Thickness x 2

Note – Perform height only after the dressing process is completed

ADT = Dicing
Advanced Dicing Technologies



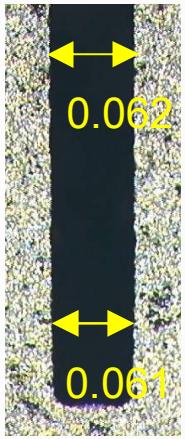
Application – Tic – Magnetic head

General:

This process involves thin blades with fine diamond grits.
The quality criteria's are challenging and require unique dressing processes which are in house developed and are confidential for each customer.
The dressing process involves O.D. grinding on cylindrical grinders and than preliminary dressing on the dicing saws Using fine silicon carbide or Al. Oxide dressing medias and an override process on Tic. Blank material to confirm cut quality.

The following recommended dressing procedures were developed and used successfully in ADT during blade optimization for some key magnetic head customers.

Application – Tic – Magnetic head Parting process



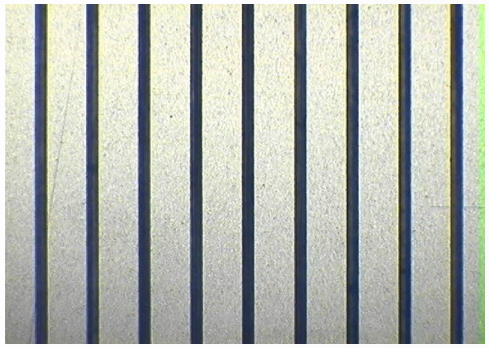
Blade used – Nickel – 4.3" O.D. x 3-6 & 4-6mic. Grit x special matrix x 0.060 – 0.100mm thick

Dressing media – Silicon Carbide – 600 mesh

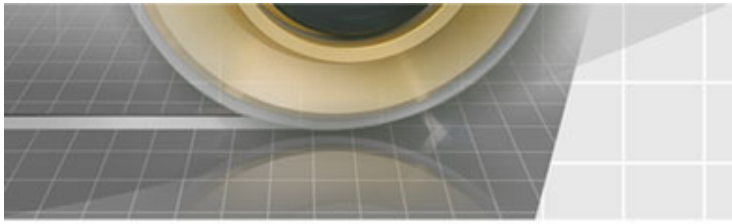
Dressing media geometry – 90 x 25 x 3mm

Dressing media P/N – 00767-0600-003

Dressing parameters	Process
Spindle speed – (Krpm)	9
Feed rate – mm/sec x Cut depth – (mm)	2 x 5 cuts x 0.050 c. depth 2 x 2 cuts x 0.550 c. depth
Cut length –	175mm
Index –	Blade Thickness x 3



ADT = Dicing
Advanced Dicing Technologies

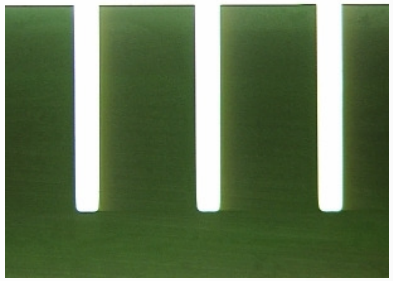


Dressing – Silicon carbide 600 mesh
- Spindle – 9Krpm
- 5x cuts at cut depth of – 0.050mm
- 2x cuts at cut depth of – 0.550mm
- Feed rate – 2mm/sec

Application – Tic – Magnetic head
Process: Row Slicing

Blade used – Nickel – 4.3" O.D. x 4–8, 10, 13mic. Grit x special matrix
x 0.090 – 0.120mm thick
Dressing media – Silicon Carbide – 600 mesh
Dressing media geometry – 90 x 25 x 3mm
Dressing media P/N – 00767-0600-003

Dressing parameters	Process
Spindle speed – (Krpm)	8 - 9
Feed rate – mm/sec x Cut depth – (mm)	2 x 6 cuts x 0.050 c. depth 2 x 2 cuts x 0.650 c. depth
Cut length –	200mm
Index –	Blade Thickness x 3



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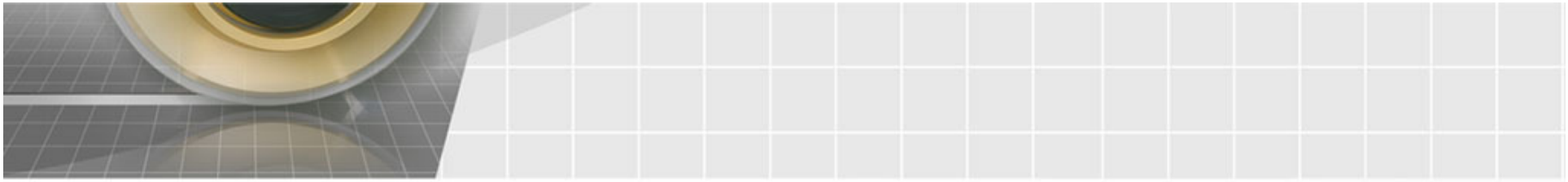
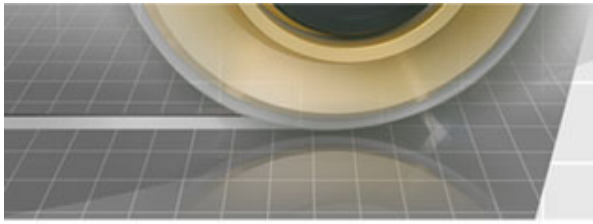


Application – Green ceramic

Green ceramic or unfired ceramic requires a different dicing mechanism of using nickel electroformed blades or Tungsten carbide saw blades.
Both with nickel blades and with T. carbide saw blades no dressing is required.

No real diamond exposing is needed on nickel blades and on
T. carbide blades any dressing will actually damage the blade buy loosing the sharpness of the teeth.

So directly dicing production substrate can be performed



Application – PZT (Ultrasound Sensors)

Blade used – Nickel – 2" O.D. x 3-6 & 4-8mic. Grit x Low Dia.%
x 0.020– 0.075mm thick

Dressing media – Silicon Carbide – 600 mesh up to 3000 mesh

Dressing media geometry – 90 x 25 x 3mm 75 x 75 x 1mm and others

Most PZT customers developed their own dressing process which is Usually confidential. The bellow are generic guide lines for a new user.

Dressing parameters	Process
Spindle speed – (Krpm)	20-30
Feed rate on Sil C.– mm/sec x Cut depth – (mm) On Sil. or PZT	2 x 5 cuts x 0.050 c. depth 2 x 2 cuts x prod. c. depth Start at production F.R. (1-3mm/sec) x cut depth of 0.10mm. Change cut depth by steps of 0.050mm every 5 cuts till reaching production depth
Cut length – To be optimized Index – Blade Thick. x 3	

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