

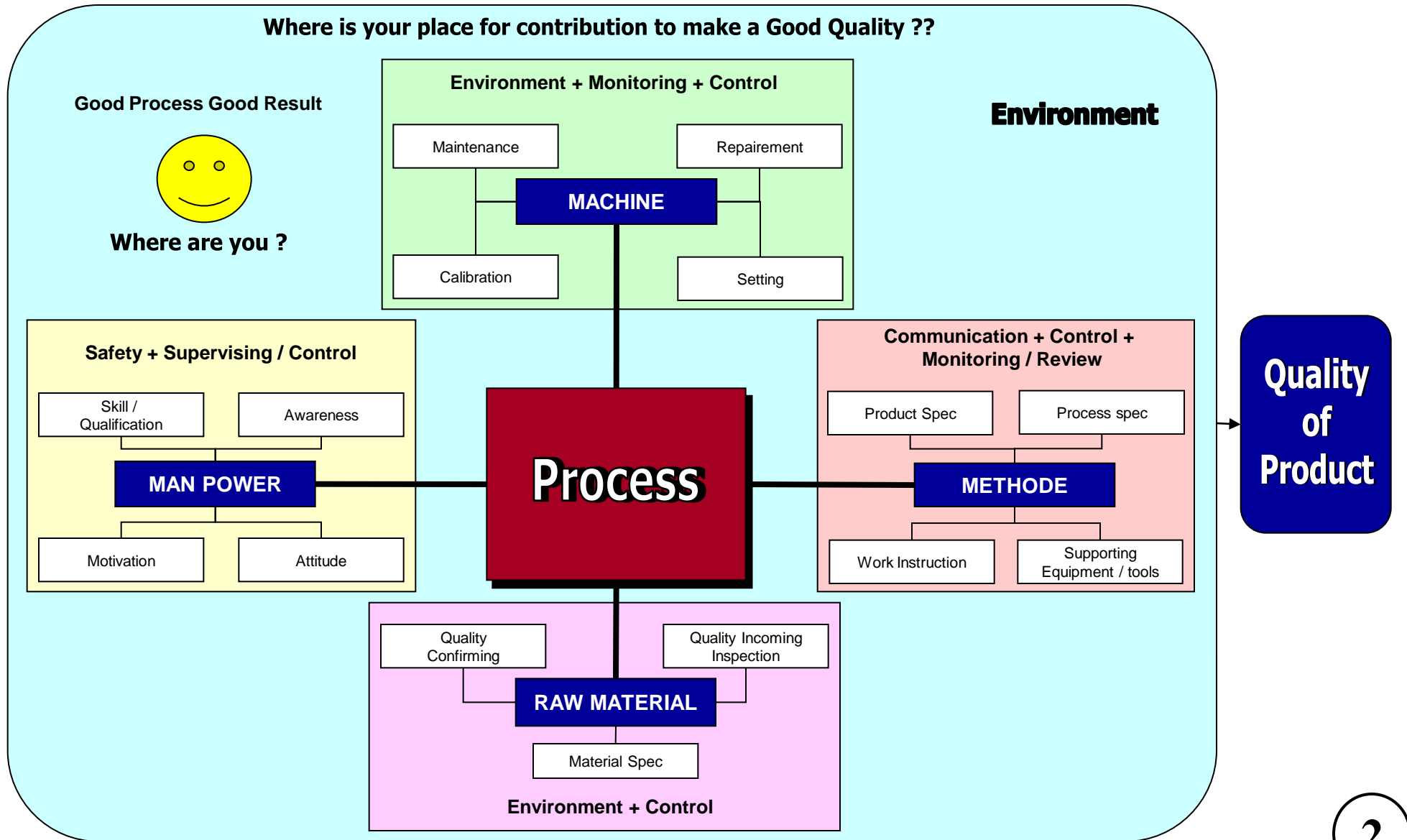
PROCESS CONTROL PLAN

SMART CARD



Prepared by : MUHTAROM ASIDIQ (PRODUCTION TRAINING) -----

Good Process + Good Attitude ➡ Good Quality + Good Output



PENGERTIAN

- ❑ Proses Control Plan adalah Sistem pengontrolan pada suatu proses yang dilakukan oleh proses Control, Operator dan Leader atau Supervisor.
- ❑ Manufacturing specification adalah Batasan atau spesifikasi suatu produk yang diperbolehkan dari hasil suatu proses.
- ❑ Proses Condition Table adalah Batasan atau spesifikasi kondisi mesin yang diperbolehkan pada saat proses .

CONTROL PLAN

DIE BONDING

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
1	Glue Coverage			Refer to Smartcard Reject Criteria for DB (Doc. No. PO8Hb8-001) Acc =0 Rej = 1	Manual Peel off test	2 pcs/lot	Every starting new lot	Operator
2	Glue Thickness		*	Contact : 5-30 μm Contactless : 5 - 15 um	Spherical micrometer screw	4 pcs/lot	Every starting new lot	Operator
3	Die Bonding Appearance			Refer to Smartcard Reject Criteria for DB (Doc. No. PO8Hb8-001) Acc =0 Rej = 1	Visual Magnifier (5x)	6 pcs/lot, top and bottom side	3x / lot	Operator
4	Release agent Condition (for Contact type)		*	No shifted position, no over or insufficient width	Jig and Magnifier (5x)	4 pcs/lot	Every starting new lot	Operator
5		Wafer Chip and Lead Frame Tape Orientation	*	Refer to Bonding Diagram	Visual Microscope and Magnifier	All Wafer Chip and Lead Frame Tape	Every starting new lot	Operator
6		Wafer Mapping Loading		Die Bond MFG Spec (Doc. No G08Ga8-001A)	Naked eyes	All Wafer	Every beginning process	Operator
7		Cure Temperature Setting		170 ± 10 °C (Top Heater) 160 ± 10 °C (Bottom Heater)	Surface Thermometer	2 points / machine	1x/Week or Start up machine	PC
				According to Die Bond Parameter table	Machine Display	2 points / machine	Every starting new lot (MC Display)	Operator
8		Die Bond Parameter Setting		According to Die Bond Parameter table	Machine Display	all machine	1x / shift or after conversion set up.	Operator
9		Lead frame Rail Cleanliness		No remained foreign material	Naked eyes	all machine	1x / day or after conversion set up.	Operator
10		Glue Nozzle and Rubber tip Cleanliness		No cloged, No bent, No worn out and No remained foreign material	Microscope	All Nozzle and Rubber tip installed	Every starting new lot	Operator
11		Bond Force		According to Die Bond Parameter table	Dial gauge Check	1 reading/ machine	1 x/ week or start up	PC

CONTROL PLAN

DIE BONDING

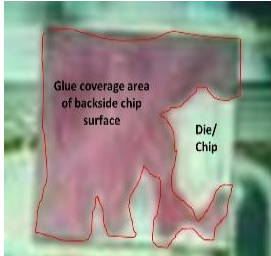

1.Glue Coverage

Glue coverage adalah kondisi kerekatan glue pada bagian bawah chip yang menempel pada die pad lead frame. Metode untuk mengetahui kerekatan glue dengan cara manual peel off test. Frekuensi sampling setiap lot baru, Dengan quantity 2 pcs per lot. yang melakukan adalah operator.

A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
1	Glue Coverage			Refer to Smartcard Reject Criteria for DB (Doc. No. PO8Hb8-001) Acc =0 Rej = 1	Manual Peel off test	2 pcs/lot	Every starting new lot	Operator

B. Reject Kriteria Glue Coverage

Glue Coverage	<p>Kondisi Glue tidak melekat pada backside chip setelah dilakukan Die peel of test</p> <p>(The glue paste coverage area on the chip backside after die peel off test)</p>			Microscope	<p>Reject apabila Coverege/Wetability Glue kurang dari 75%</p> <p>(Reject if the coverage/wettability glue paste located on the backside of chip < 75%.)</p>
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CONTROL PLAN

DIE BONDING

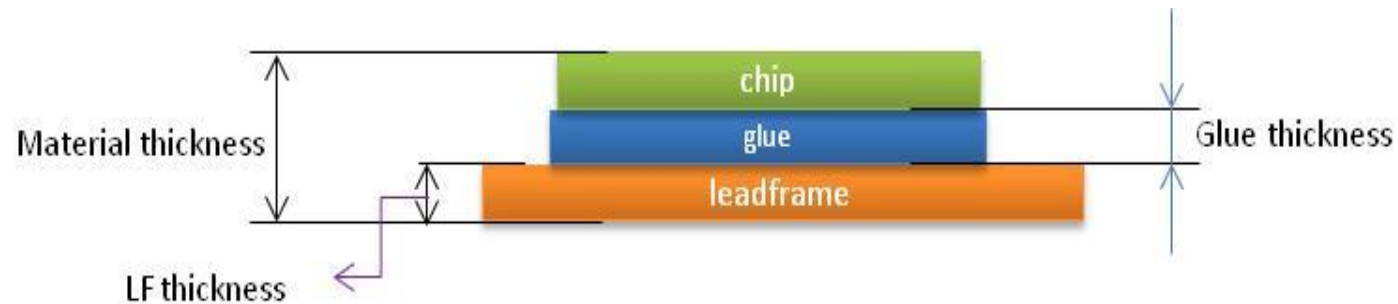
2.Glue Thickness

Glue thickness adalah ketebalan dari glue paste di leadframe. Pengecheckkan dilakukan setiap awal lot baru.

A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
2	Glue Thickness		*	- Contact : 5-30 μm - Contactless : 5 - 15 um	Spherical micrometer screw	4 pcs/lot	Every starting new lot	Operator

B. Penghitungan Glue Thickness



Proses Spesifikasi :

1. Contact Type & E-TAG : 5 – 30 μm
2. Contactless : 5 – 15 μm

CONTROL PLAN

DIE BONDING














3.Die Bonding Appearance

Adalah kondisi material setelah proses Die bonding, Dokumen yang digunakan sebagai panduan adalah berdasarkan dengan dokumen kriteria reject smartcard.

A.Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
3	Die Bonding Appearance			Refer to Smartcard Reject Criteria for DB (Doc. No. PO8Hb8-001) Acc=0 Rej = 1	Visual Magnifier (5x)	6 pcs/lot, top and bottom side	3x / lot	Operator

B.Dokumen Kriteria Reject Smartcard

 TAC - INDONESIA		Title : UID- Smartcard Reject Criteria		Page 7 of 17	
PT. UTAC Manufacturing Services Indonesia		Doc Number (ID): PO8Hb8-001	Revision No: 01		
4.2 DIE BOND REJECT CRITERIA					
Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Insufficient Glue filling	The glue paste that fills on chip side, it can be seen by any glue around each edge of chip			Microscope	Reject if the amount of glue paste around edge of chip < 80%
Glue Coverage	The glue paste coverage area on the chip package after die peel off test			Microscope	Reject if the coverage/visibility of glue paste on the backside of chip < 70%
Glue Overflow	The glue paste that overflow on chip surface			Microscope	Reject glue paste spreading exceed of the chip thickness
Shifted Bond Position	Chip placement position is shifted from the center area of die pad			Measuring Microscope	Reject if Chip bonding position shifted > 0.5mm in XY direction
Lifted Die	Chip / die is lifted off during die bonding process			Microscope	Reject if any chip / die is lifted off from lead frame tape
Chip dent	Any chip that shows dented point of chip surface			Microscope	Any dented on chip is not allowed.
Shifted Release agent position (for Contact type)	Release agent position should be center on contact hole area / not shifted			Naked eye / Microscope	Reject if release agent shifted side, which near mislead punch area.



Visual Magnifier

Sample check :
6 pcs/lot bagian atas dan bawah

Frekuensi :
3x / lot

Pic :
operator

CONTROL PLAN

DIE BONDING


4.Release Agent Condition















Adalah kondisi pembondingan Release Agent pada Leadframe tape,Dokumen yang digunakan sebagai panduan Adalah berdasarkan dengan dokumen kriteria reject smartcard.

A.Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
4	Release agent Condition (for Contact type)		*	No shifted position, no over or insufficient width	Jig and Magnifier (5x)	4 pcs/lot	Every starting new lot	Operator

B.Dokumen Kriteria Reject Smartcard

		Title : UID- Smartcard Reject Criteria		Page 7 of 17
PT. UTAC Manufacturing Services Indonesia		Doc Number (ID)	POH05-001	
		Revision No.	01	

Reject Name	Description	Defect Picture / Illustration	Good unit Picture	Equipment	JUDGEMENT
Insufficient Glue filling	The glue paste that filling on chip side. It can be seen by any glue around each edge of chip			Microscope	Reject if the amount Glue paste around edge of chip < 80%
Glue Coverage	The glue paste coverage area on the chip backside after die peel off test			Microscope	Reject if the coverage verifiability glue paste coated on the backside of chip < 70%
Glue Overflowed	The glue paste that overflowed on chip surface			Microscope	Reject glue paste spreading exceed of the chip thickness
Shifted Bond Position	Chip placement position is shifted from the center area of die pad			Measuring Microscope	Reject if Chip bonding position shifted > 0.5mm in XY direction
Lifted Die	Chip / die is lift off during die bonding process			Microscope	Reject if any chip / die is lifted off from Lead frame tape
Chip dent	Any chip that shows dented point of chip surface			Microscope	Any dented on chip is not allowed.
Shifted Release agent position (for Contact type)	Release agent position should be center on contact hole area / not shifted			Naked eye / Microscope	Reject if release agent shifted side, which lead mislead punch area.



Visual Magnifier

Sample check :
4 pcs/lot

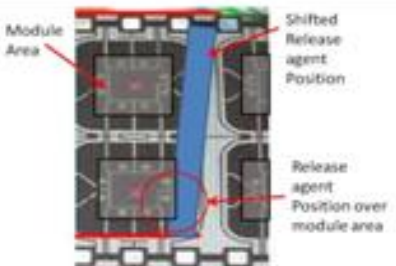
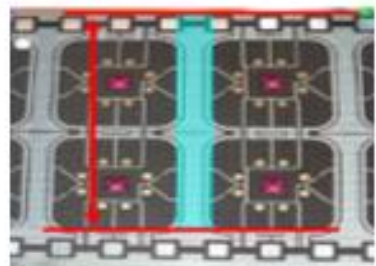
Frekuensi :
Setiap starting Lot Baru

Pic :
operator

CONTROL PLAN


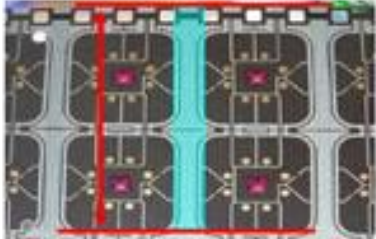
DIE BONDING

A. Shifted Release Agent Position*

Shifted Release agent position (For Contact type)	Release agent position should be center on sprocket hole area / not shifted			Naked eye / Microscope	Reject if release agent shifted and reach final module punch area.
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*Release agent yang mengenai area Package material, dapat menyebabkan Reject Peel off pada material

B. Release Agent Width

Release agent width (For Contact type)	Release agent width should be proportional on writing area / unit			Naked eye / Microscope	OK if Release agent width writing Contact 8 = 2.4 – 2.8 mm, Contact 6 = 1.4-1.6 mm (not bold and not thin)
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CONTROL PLAN

DIE BONDING

5. Wafer Chip and Leadframe tape Orientasi

Pada saat proses material di Die bonding, Wafer chip & Leadframe orientasi haruslah benar. Dokumen yang Menjadi panduan untuk menentukan arah orientasi wafer chip dan Leadframe adalah Bonding Diagram.

A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
5		Wafer Chip and Lead Frame Tape Orientation	*	Refer to Bonding Diagram	Visual Microscope and Magnifier	All Wafer Chip and Lead Frame Tape	Every starting new lot	Operator

B. Dokumen Bonding Diagram

BONDING DIAGRAM NO: CON6-59213-005

UID Ref. Name	R_MM094A	PID No.	59213C-23
Lead Frame Tape Reference	9X124-06 CA NXTL		
Bond Pad Size (mm)	0.30 x 0.30		
Lead Frame Thickness (mm)	1.00 ± 0.05		
Chip Name	59213C		
Type Code	-		
Chip Size (mm) with scribe line	(0.1880 x 0.1880)		
Chip Thickness (mm)	0.10		
Bond Pad Size (mm)	0.30 x 0.30		
Rubber Tip No.	R3-106-6		
Dispense Nozzle No.	256 (wire)		
Rotation Nozzle Wafer Map	0°		
Wire Type - Diameter (mm)	Au-25		
Max Wire Length (mm)	1.56		
Wire amount	5		
Loop Mode	SmartLoop / J Loop		
Start Wire	Pad 1 (Grid) Lead 1		
Continuity Type	1525		

Title: Bonding Diagram Contact 6 Gold - 59213 - 005

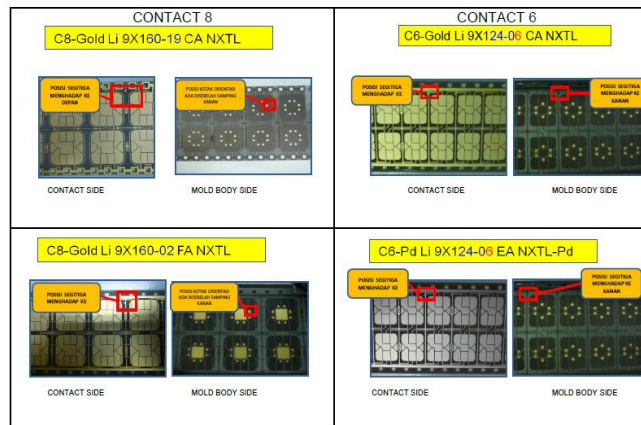
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Rev. No.: 01

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Bonding Diagram



Leadframe Orientasi

Sample check :
All wafer chip & LF tape

Frekuensi :
Setiap starting Lot Baru

Pic :
operator

CONTROL PLAN

DIE BONDING

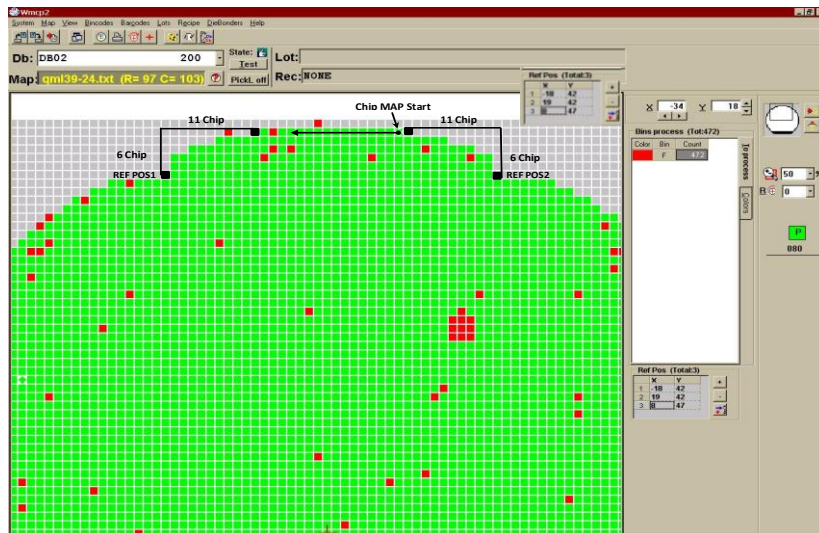
6. Wafer Mapping Loading

Loading Wafer Mapping diperlukan untuk pembacaan material wafer di mesin Die bonding. untuk mengetahui Chip Good & NG. Chip Good berwarna Hijau dan Chip NG berwarna Merah.

A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
NO	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
6		Wafer Mapping Loading		Die Bond MFG Spec (Doc. No G08Ga8-001A)	Naked eyes	All Wafer	Every beginning process	Operator

B. Dokumen Die Bond MFG spect



Sample check :
All wafer chip & LF tape

Frekuensi :
Setiap starting Lot Baru

Pic :
operator

CONTROL PLAN

DIE BONDING

7. Cure Temperature Setting

Pada proses Die Bonding ,Cure temperatur digunakan untuk mempercepat proses pengeringan Glue paste antara Chip dengan Leadframe.

A. Control Plan

Characteristics			Special Char. Class	Product/ Process Specification/Tolerance	Methods Evaluation/ Measurement Technique	Sample		Pic
NO	Product	Process				Size	Freq	
7		Cure Temperature Setting		170 \pm 10 °C (Top Heater) 160 \pm 10 °C (Bottom Heater)	Surface Thermometer	2 points / machine	1x/Week or Start up machine	PC
				According to Die Bond Parameter table	Machine Display	2 points / machine	Every starting new lot (MC Display)	Operator

B. Cure & Display



Cure Die Bond



Top Heater : 170 \pm 10°C
Bottom Heater : 160 \pm 10°C

Display Cure Temperatur

Sample check :
2 point / machine

Frekuensi (pc) :
1x per minggu aktual check
Frekuensi (prod) :
Setiap awal Lot Baru

Pic :
Pc & Prod

CONTROL PLAN

DIE BONDING

8. Die Bond Parameter Setting

Die bond parameter ditetapkan dengan melakukan evaluasi pada proses material untuk mendapatkan hasil Proses material yang bagus.parameter ditetapkan oleh AE.

A.Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
8		Die Bond Parameter Setting		According to Die Bond Parameter table	Machine Display	all machine	1x / shift or after conversion set up.	Operator

B.Die Bond Parameter



Display Parameter mesin

AREA	DIE BOND
MACHINE NO.	MCH01
MACHINE TYPE	EMEC JAMESUP
PACKAGE TYPE	CONTACT 98
DEVICE #	All devices

MATERIAL / TOOL	UNIT(S)	DESCRIPTION
Die Paste Type	N/A	Adhesive 2008 80
Die Nozzle Type	N/A	250 (1 hole)
Rubber Tip Color	N/A	Refer to Bonding Diagram
Headset	N/A	SEN-00000

PARAMETER ITEM	UNIT(S)	PARAMETER RANGE	RECOMMENDED SETTING
Blow Pressure	MPa	0.7~1.0	0.9
Blow Distance	mm	20~100	100
Blow Distance Time	s	0.08~0.20	0.10
Pick up Force	N	0.4~1.0	0.6
Pick up Time	ms	50~200	100
Pick Up Speed Z position	mm	8~12	10.7
Epilator Headset top height	mm	0.10~0.7	0.24
Bond Force	N	0.4~1.0	0.7
Bond blow time	ms	30~80	30
Pre scrub time	ms	2~10	5
Post scrub time	ms	2~10	4
Bond Z-height	mm	+0.4~0.6	0.58
Cure Temperature	Top heater	°C	180±10
Bottom heater	°C	150±10	160

Dokumen standar Parameter

Sample check :
All machine (mencatat data
Parameter di display mesin)

Frekuensi (pc) :
1x / shift or after conversion
Set up

Pic :
operator

CONTROL PLAN

DIE BONDING

9. Lead Frame Rail Cleanliness

Pada saat proses material di mesin Die bonding, kondisi Rail harus bersih. Untuk mencegah terjadinya reject pada Seperti Contamination, scrath dan discoloration

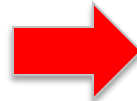
A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
9		Lead frame Rail Cleanliness		No remained foreign material	Naked eyes	all machine	1x / day or after conversion set up.	Operator

B. Lead frame rail



Pembersihan Rail



Menggunakan Bemcot & Alkohol

Sample check :
All machine (membersihkan
Jalur rail material)

Frekuensi (pc) :
1x / day or after conversion
Set up

Pic :
operator

CONTROL PLAN

DIE BONDING

10. Glue Nozzle & Rubber Tip Cleanliness

Pada saat proses material di mesin Die bonding, kondisi nozzle & Rubber tip harus bersih. Apabila Nozzle mampet Akan menyebabkan insuf Glue, dan apabila rubber tip kotor akan menyebabkan Contaim pada material.

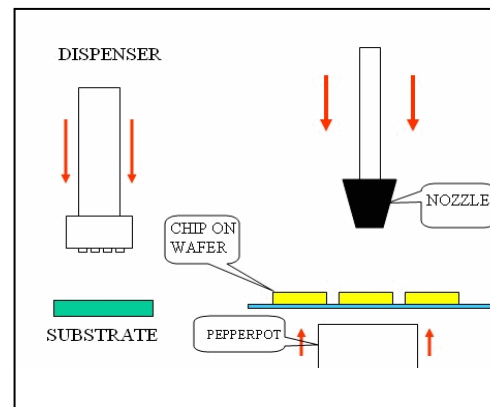
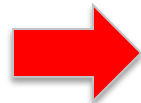
A. Control Plan

Characteristics			Special Char. Class	Methods				Pic
N0	Product	Process		Product/ Process Specification/Tolerance	Evaluation/ Measurement Technique	Sample		
						Size	Freq	
10		Glue Nozzle and Rubber tip Cleanliness		No cloged, No bent, No worn out and No remained foreign material	Microscope	All Nozzle and Rubber tip installed	Every starting new lot	Operator

B. Glue Nozzle & Rubber Tip



Nozzle & Rubber Collet



Kerja Nozzle & Rubber Collet

Sample check :
All Nozzle and Rubber Tip
installed

Frekuensi (pc) :
Every starting new lot

Pic :
operator

TERIMA KASIH