CUSTOMER SITE

SPECIFICATIONS
for
TFC-2000C
(Fully Automated Flip Chip Bonder)

Name	Signature	Date(YY/MM/DD)
Approved by		
Approved by		

SHIBAURA MECHATRONICS CORPORATION		
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SHIBAURA MECHATRONICS CORPORATION

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1. PURPOSE

This machine picks up and flip Die from wafer, and bond on substrate. With rich optional function, this machine will apply various kinds of flip die package process.

2. FEATURES

2-1. High productivity : 2.5 sec. / die

(without process time under SHIBAURA standard condition)

Note1: Chip size is 5mm x 5mm which is made of glass. Substrate is made of glass, too. The Cycle time depends on characteristic of chip and substrate (chip size, position of fiducial mark, extension of substrate etc).

2-2. High alignment accuracy : 5. 0 um (3σ)

(between glass chip and glass substrate under the SHIBAURA standard condition)

Note2: Chip and substrate that are notched the graduations is made of glass. Alignment accuracy is measured by a bonding position-teaching camera

2-3. Easy operation : Color touch panel adopted

2-4. Small foot print : Width :1,178 mm by Depth :1,567 mm

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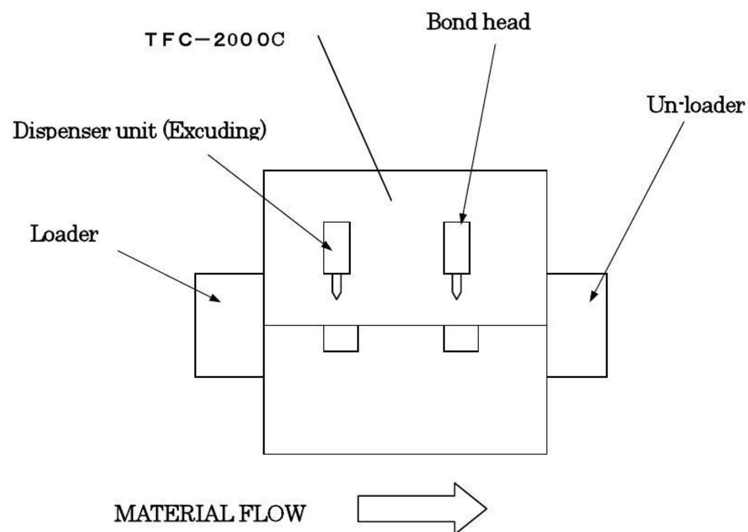
3. CONSTRUCTION



4. SUPPLY SCOPES

Amounts of Machine :One(1) unit

4-1 STANDARD SPECIFICATION (Supply scope of 1 UNIT)

Item				Note
Main body	Base	Bond Head(X, Y, Z, Theta) Tool : 1unit Clump : 1unit	1 set	
		Flip Unit Colette : 1unit	1 set	
		Substrate transfer unit *Roller and clamper method	1 set	W= ~~85~~ 87 mm
		Bond stage unit Stage : 1unit X,Y,Z table : 1 unit	1 set	Individual type
		Wafer supply unit Wafer cassette elevator : 1 unit Wafer supply X Y table : 1 unit Die eject unit : unit	1 set	In case of tray use, no use the die eject unit.
		Tape/Die recognition X,Y,Z table : 1 unit	1 set	
	Recognition	Recognition controller : 1 unit Tape/Die recognition camera : 1 unit Wafer recognition camera : 1 unit Color monitor : 1 unit	1 set	
	Controller	Controller : 1 unit Color touch panel : 1 unit MO Driver : 1 unit	1 set	
Accessory	Standard tools (wrench, spanner, screw driver, pair of pincers, etc)		1 set	
Spare part	Standard Spare parts *Filter Element : 1 unit *Fuse : 1 unit *Illumination Lamp for APS : 2 units *Thermo couple : 2 units *Flip Unit Nozzle : 1 unit for each devices		1 set	

4-2. Option supply area (per 1 machine)

			Set		Remark
TFC-2000 Option	Head part	Constant heat		Exclude	MAX 250deg.C.
		Constant heat		Exclude	MAX 500deg.C. (setting)
		Pulse heat	1	Include	MAX400deg.C.
		Stage heat	1	Include	MAX200deg.C.
		Vacuum type stage	1	Include	
		Stage Tool cooling Function	1	Include	
	Dispense unit *Controller: 1 unit (Standard : Musashi eng. 9000 Sigma II series) *XY robot :1 unit *Needle stage clamp: 1set	Dispense machine		Exclude	
		Change of controller		Exclude	
		Syringe temp. controller		Exclude	
		Recognition camera		Exclude	
		Constant heat stage		Exclude	Vacuum type
	Monitor	Bonding position teach camera :Camera, color monitor:1 set		Exclude	X,Y motor drive Z manual adjustment
	Other	WAFER BLOW	1	Include	
		Dispense - Bonding Pre-heat Function		Exclude	
		Auto-Tray supply	1	Include	Use 8" wafer unit
		Ionizer	1	Include	
		392N Bomding force		Exclude	
		6 inch Wafer	1	Include	
	Loader for the carrier magazine		1	Include	For W 87 carrier
	Un- loader for the carrier magazine		1	Include	For W 87 carrier
	Note	1)HEPA FILTER			

4 - 3 Option parts supply area (1 machine)

ITEM			Set		Remarks
Accessory (Option)	Change Over Kits *Device name: A (temporary)	*Clamp(upper) : set *Bonding Tool : set *Bonding stage: set * Flip nozzle : set *Die eject parts : set *Other ( ): set		Exclude	
	Change Over Kits *Device name: B(temporary)	*Clamp(upper) :1set *Bonding Tool :1 set *Bonding stage:1 set * Flip nozzle :1 set *Die eject parts: set *Other ( ) : set		Exclude	
	Tray palette	Tray palette (2 inch)		Exclude	
		Tray palette (3 inch)		Exclude	
		Tray palette (4 inch)		Exclude	
	Other spare parts List	Pulse heat tool		Exclude	Device name:
		Pulse heat tool		Exclude	Device name:
		Pulse heat tool		Exclude	Device name:
		Eject Needle		Exclude	
	The others	Flip Unit Nozzle		Exclude	
		Eject Needle(10 units)		Exclude	
		Filter Element		Exclude	
		Fuse		Exclude	
		Illumination Lamp for APS		Exclude	
		Sense bee(for bonding stage)		Exclude	
		Cartridge Heater(bonding)		Exclude	
		6 inch Ring Size Parts		Exclude	Manufacture:
		8 inch Ring Size Parts		Exclude	Manufacture:
		Magazine for wafer		Exclude	
		Magazine for carrier		Exclude	
	Remarks				

4-4 WORK SHARE

No.	Item	SHIBAURA	Customer	Note
1	Design/production of the machine	●		
2	Packing/transport	●		
3	Adjustment	●		
4	Training	●		
5	Primary wiring/pipe laying		●	
6	Secondary wiring/pipe laying	●		
7	Foundation work (at customer site)		●	
8	Adjustment's power/air supply (at customer site)		●	
9	Foundation work's power/air supply (at customer site)		●	
10	Adjustment's materials (at customer site)		●	
11	Adjustment's materials (at customer site)		●	
Note This is based on FOB Japan.				

Note1: When this machine will be brought at your company, we hope to your cooperation in carrying by a forklift or a crane. And, equipments that have installed already will be transferd by your side.
Note2: Working hours is from 8 AM to 5 PM as a general rule.

4-5 Othesrs

No.	Item	Enforcement or not	Note
1	The pre-buy off at SHIBAURA	●	
2	The training at customer		
Note			

5. WORK PIECES to be supplied by CUSTOMER

5 - 1.CARRIA

	Product for buy-off		
Width(mm)	87		
Length (mm)	190		
Thickness (micrometer)	0.5		
Material	SUS		

5 - 2.Die

	Product for buy-off		
Size : X x Y (mm)	5.04 x 6.48		
Thick (mm)	0.4		

5 - 3.Wafer

	Product for buy-off		
Wafer size (mm)	DISCO 2-8 INCH		
Wafer frame diameter (mm)	—		
Wafer frame thickness (mm)	—		
Bad mark size (mm)	—		
Sheet Type	—		

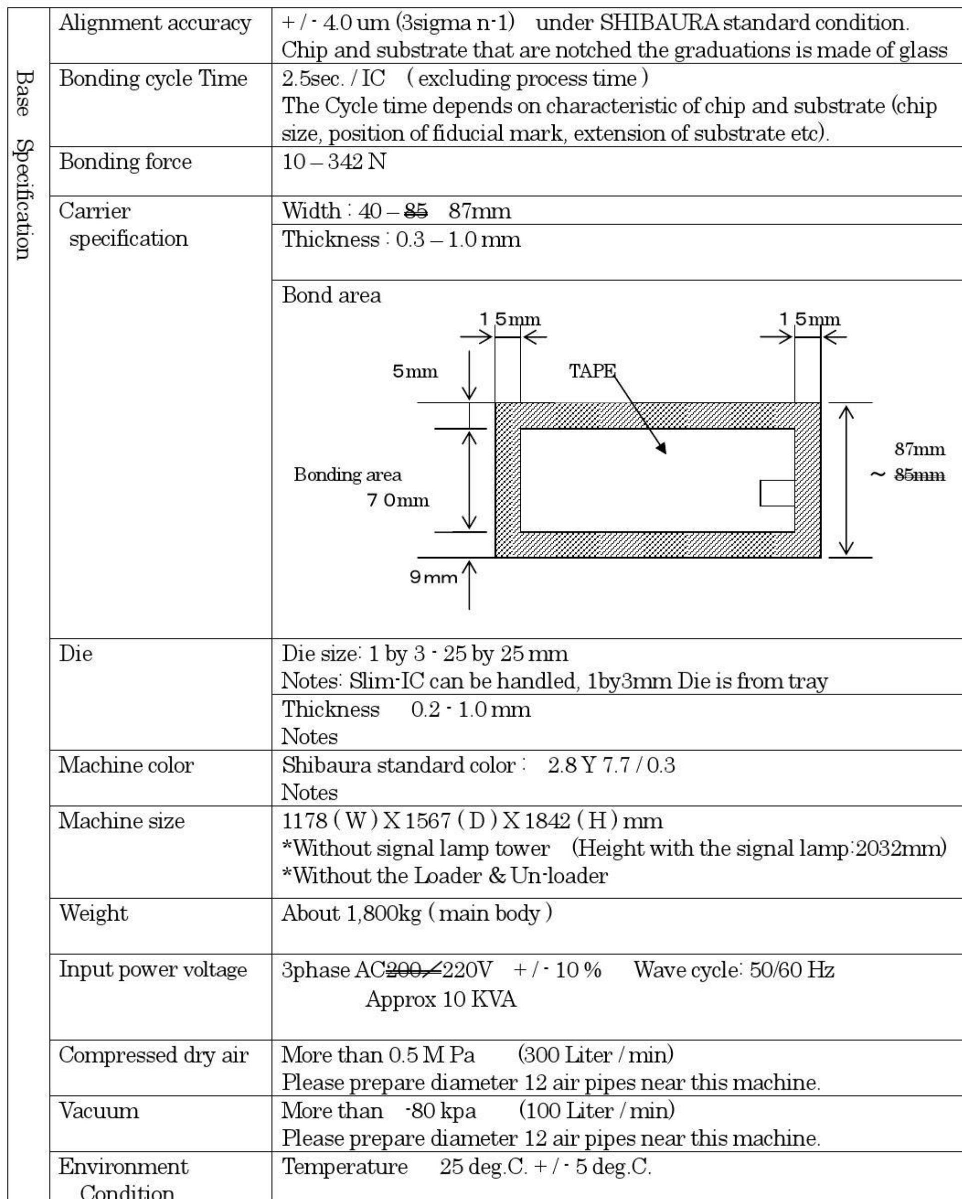
5 - 4.Wafer cassette

	Product for buy-off		
Pitch (mm) x Step	DISCO-2-8-1		
Width x Depth (mm)	—		
Height (mm)	—		

5 - 5.Tray

	~~Product for buy-off~~		
~~Size (mm) X x Y x Z~~			
~~Array~~			
~~Depth of the hollow (mm)~~			
~~Pitch(X x Y) (mm)~~			
~~Material~~			
~~Color~~			

6. BASE SPECIFICATION



Base Specification	Item	Specification
	Alignment accuracy	+ / - 4.0 um (3sigma n-1) under SHIBAURA standard condition. Chip and substrate that are notched the graduations is made of glass
	Bonding cycle Time	2.5sec. / IC (excluding process time) The Cycle time depends on characteristic of chip and substrate (chip size, position of fiducial mark, extension of substrate etc).
	Bonding force	10 – 342 N
	Carrier specification	Width : 40 – ~~85~~ 87mm
		Thickness : 0.3 – 1.0 mm
		Bond area 1 5mm 1 5mm 5mm TAPE 87mm ~ ~~85mm~~ Bonding area 7 0mm 9mm
	Die	Die size: 1 by 3 - 25 by 25 mm Notes: Slim-IC can be handled, 1by3mm Die is from tray
		Thickness 0.2 - 1.0 mm Notes
	Machine color	Shibaura standard color : 2.8 Y 7.7 / 0.3 Notes
	Machine size	1178 (W) X 1567 (D) X 1842 (H) mm *Without signal lamp tower (Height with the signal lamp:2032mm) *Without the Loader & Un-loader
	Weight	About 1,800kg (main body)
	Input power voltage	3phase AC~~200/~~220V + / - 10 % Wave cycle: 50/60 Hz Approx 10 KVA
	Compressed dry air	More than 0.5 M Pa (300 Liter / min) Please prepare diameter 12 air pipes near this machine.
	Vacuum	More than -80 kpa (100 Liter / min) Please prepare diameter 12 air pipes near this machine.
	Environment Condition	Temperature 25 deg.C. + / - 5 deg.C.

7. MACHIN SPECIFICATION

(1) Bonding head

Standard	Head control	X, Y , Z axis programmable control	
	Load control	Feed back control by the Load Cell; 1N step, accuracy_	
	Tool Tilt Adjustment	Standard equipment (manual by micro meter)	
Option	Tool	Constant heat (Max 250deg.C.)	Exclude
		Constant heat Max 500deg.C. (about 550deg.C. setting) (Adjusted resolution 1 deg.C., Temp. accuracy; +/- 5 deg.C.)	Exclude
		Pulse heat *Room Temperature – 400deg.C. (about500deg.C.setting is possible) Resolution; 1 deg.C.	Include
	Note		

(2) Flip unit

Die Flip unit	Die Pick-up load	0.3 - 1.2 N
	Load control	by VCM (programmable)
	Kind of pick-up tool	Metal body
	Pick-up collet	1piece (typical article) Rubber type
	Note :	

(3) INDEXOR

Standard specification	Carrier indexing method	Roller and clamp method (Programmable)	
	Applicable substrate Width	40 – ~~85~~ 87 mm Carrier size (W)50x(L)250x 1.4t can be handled	
	Carrier thickness	0.5 – 1.5 mm (warp age; less than +/- 0.5 mm)	
	Index orientation	Center orientation	
	Rail width change	Auto change	
	Indexing direction	Left to right	
Option			

(4) Bond stage

Standerd	How to Fix the substrate	Height adjustment (programmable)	
	Material	(a) Stainless steel (b) Stainless steel with quartz… for 1 kind of device	
Option	Stage heater	Constant heat : R.T. - Max200deg.C. Substrate fixing : Vacuum stage + clamp	Include
	Note Stage Tool cooling Function		

(5) Wafer Transfer unit

Wafer supply unit	Die supply form	Wafer (Option: In case of Tray, keeping up with the tray palette)
	Supply system	Automatic film frame loading and unloading
	Wafer size	Wafer diameter :max8inch (200mm) Wafer ring diameter:228-296mm Wafer ring thikness:1.0-2.0mm
	Wafer ring size	Wafer ring diameter :228 - 296 mm Wafer ring thickness :1.0 - 2.0 mm
	Automatic Wafer Ring Holding system	Standard (Wafer sheet unloading with Heat blow)
	Expansion	Standard Stretching stroke : 0 - 7mm(0.5 mm / step)
Wafer Cassett e Elevator	Supply · Receive	Full automatic film frame loading and unloading
	Wafer Ring Cassette stock	1 cassette
	Cassette size	Width :220 mm - 288mm Depth :212 mm - 276mm Height :143 mm - 208.5 mm Film frame cassette pitch : Maximum 6.35mm x 25steps
	Wafer change time	About 30 sec. (Tray pallet exchange time)
Die Eject Unit	Eject Speed	Programmable
	Eject level	Programmable
	Eject stroke	Zaxis : 0 - 3mm (0.1mm / step)
	Eject needle	1 set (typical article)
	Eject back-up	Vacuum back-up method
	Back-up unit diameter	16 - 40 mm

(6) Recognition System

Wafer Recognition	Die recognition form	Gray scale vision system
	Camera	1 / 2 inch CCD camera
	Optic	1) Manual zoom type optics with half mirror Magnification = 10 X(0.2 - 2)
	Recognition mark size	Mark diameter should be bigger than (longer side of die X 3 percent)
	Die inspection	Position, Bad mark and Chipping Inspection
	Alignment	Theta correction : under + / - 2deg. First die alignment function
	Monitor indication	Indicates Vision Processing Result Indicates number of the good dies and bad dies each wafers. Indicates Good die = "G", Bad die = "B", Non die = "C" each dies
Die Recognition	Recognition Method	Gray scale vision system
	Camera	1 / 2 inch CCD camera; coaxial light with tape side Volume of light is programmable
	Magnification	X 5
	Lighting	Optical fiber lighting
Tape Recognition	Recognition method	Gray scale vision system
	Camera	1 / 2 inch CCD; coaxial light with chip side and slanting type light Volume of light is programmable
	Magnification	X 5
	Lighting	Optical fiber Lighting (straight and incline)
	Recognition area	X= + / - 15mm Y= + / - 35 mm for substrate W85mm
	Note :	

(7) CONTROL UNIT

	Item	Specification
	Operating system	Windows-NT
	Control panel	Touch panel, joy stick and key
	Operate mode	{AUTO} mode : Full auto running {STEP} mode : Unit individual running {PROG} mode : Device data program, PRS teach, Correct data, Maintenance etc.
	Sub-Memory	MO Driver
	Teaching Method	Manual data Input Teaching method
	Monitor	Operate : 11.4" TFT Color Touch Panel Recognition : 10.3" TFT Color Panel
	Signal Lamp tower	3 Color (Red , Yellow ,Green) SHIBAURA standard Red light : emergency stop Yellow blinking : operator call Yellow blinking / green light : error stop (caution) Red blinking : error stop Green blinking : auto running All right off : shutting off
	Operater call	Buzzer (SHIBAURA standard)
	Production control information	· Number of production plan · Number of bonding plan · Yield of substrate · Number of bonding · Number of dispensing · Number of bad dies · Net working rate · Working time · Stopping time during trouble · Number of idle time · Item of errors · Net working rate · Error record etc
	Language	English
	Note :	

(8) Main Option

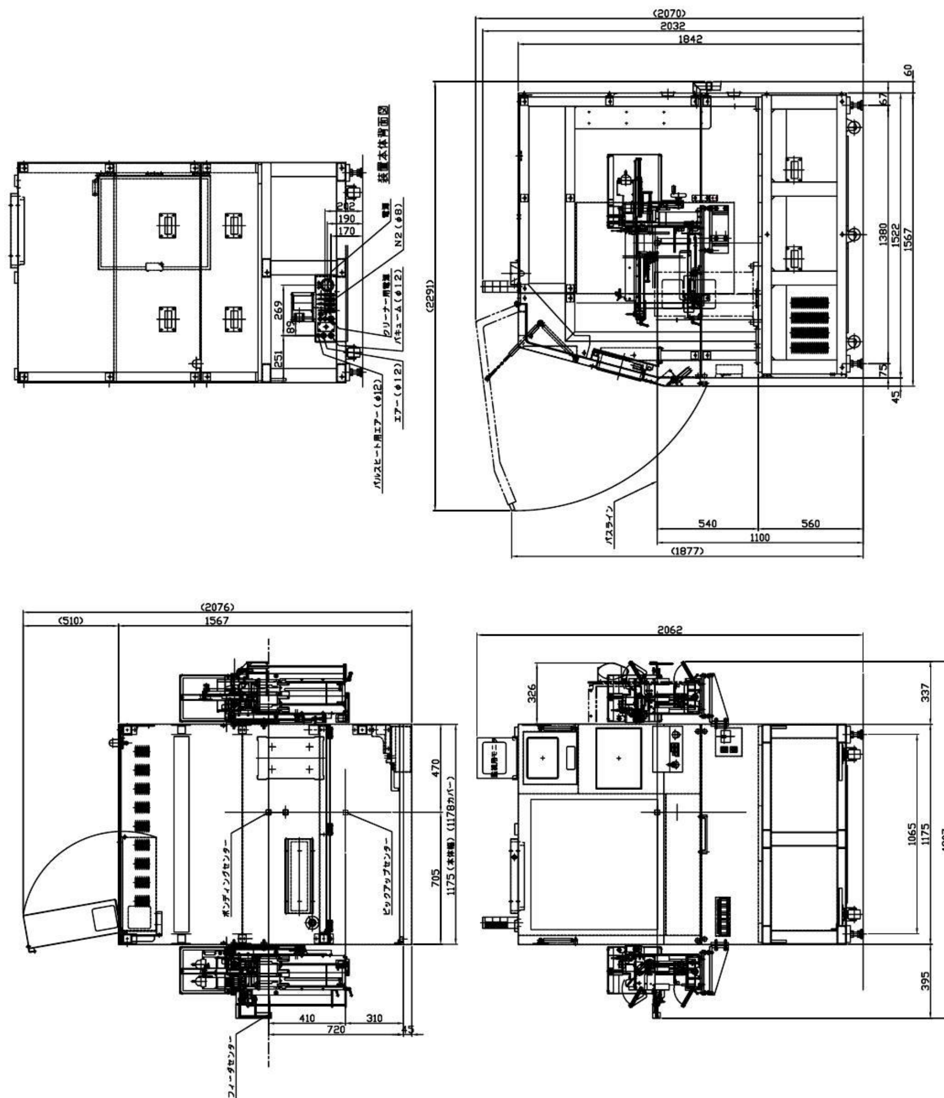
(8)-1Dispense Unit : Excude

Dispense Unit	Dispense method	Writing method
	Dispensing area	X : Less than 20 PF. Y : +/- 30 mm
	Controller	Sigma MX-9000SM2 (Musashi Engineering) (Preset parameter is set on the dispenser unit)
	Stage	Heating stage (Vacuum + ~~Clamp holder~~) : 1 set Room temp.- 150deg.
	Syringe maker	10 cc (Maker : EFD)
	Needle Maker	Size : 25G
Option	recognition camera	Recognize the tape position and improve writing accuracy.
	Temp. control function	Room temp - 50deg. (for syringe)
	Remark : Because of W160 carrier, clamp holder for substrate isn't adapted.	

(8) – 2 Substrate's magazine loader / un-loader

	Method	Magazine stack
	Magazine size	Max W95 x D250 x H145mm
	Max stock number	At least 3 sets
	Others	Applicable handling carrier width; 50 – 95 mm
	Unit dimension	Loader; (W) x (D) x (H) 80 mm Un-loader; (W) x (D) x (H) mm
	Unit weight	Loader : kg Un-loader : kg
	Note :	

8. Outward appearance



9. DOCUMENTATION

Following documents shall be shipped with equipment.

1. Inspection data : Shibaura inspection data : 3sets
2. Operation manual : 2 sets (Including clean paper 1set)

Spare parts list
Device change parts list
Electrical drawing
Pneumatic diagram
Maintenance manual
} Included in Operation manual

10. PRE-BUY OFF (at SHIBAURA MECHATRONICS)

10-1. Pre-buy off place

Buy-off shall principally be done at SHIBAURA MECHATRONICS plant with customer attendance.

10-2. General items to be tested

Outlook of machine, machine shape, machine dimensions, machine constructions

Function details shall be in accordance with running test specifications. (9-3)

Check of nameplate at operation panel and controller board.

Surface treatment (Painting, plating and rust conditions etc.)

10-3. Machine running test standard

(1) Cold running

1. Tape and wafer frame loading test

Inspection item	Criterion
Substrate loading miss	***0 / 20***
Substrate indexing miss	***0 / 20***
Substrate unloading miss	***0 / 20***
Chip tray loading miss	***0 / 20***

(2) Hot running

1. Alignment accuracy shall be done using Shibaura standard evaluation work piece in the room temperature (using glass substrate, glass chips with gauge).
2. Other items below shall be done by using work pieces supplied by customer.

Inspection Item	Criterion	No. of samples
Bonding miss	Nothing	***0 / 200die***
Alignment accuracy	+/- 4.0 um (3 sigma: Cpk=1.0) *Notes	***0 / 20die***
Vision processing miss	Nothing the left-over good dies	***0 / 200die***

Notes

***How to measure the Alignment accuracy (SHIBAURA standard)**

We use Shibaura standard evaluate substrate and chips with gauge that are made of glass. During keeping close substrate and chip (about a few micrometer), we check the Alignment accuracy using the bonding position recognition camera through the substrate in the room temperature.

11. GUARANTEE

1. Guarantee period :

   1 year (24 hours running / day) from job site acceptance day.

2. Limitation :

   This guarantee is valid only in such cases Shibaura Mechatronics accepted.

3. Exclusion

   1. Shibaura Mechatronics has no obligation for damage caused by fire, flood or calamity.
   2. This guarantee shall be free from defects of machine imputable to customer or if repair or replacements of such defects are made by customer without Shibaura Mechatronics' acknowledgement.
   3. Article of consumption.

12. OTHERS

Agreement to matters not covered by basic contract between customer and Shibaura Mechatronics shall be evidenced by separate agreement signed by both customer and Shibaura Mechatronics.

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