



加高電子股份有限公司

HARMONY ELECTRONICS CORP.

# SPECIFICATIONS FOR APPROVAL

Customer Part No. :	_____	HELE. Part No:	<u>X2C016000B81H-R</u>
Application For :	_____	Products:	_____
Accepted Model :	_____	Type & Freq.:	<u>HSX211S / 16.000MHz</u>
Sample Order No :	<u>EOS-E10024-2</u>	Date:	<u>2014/01/03</u>

Approved By :

Remark:

- (1) Please acknowledge receipt of the specification attached hereto signing and returning to us one copy thereof.
- (2) Changes in the description of specifications are implemented and reissued by advance consultation.
- (3) H.ELE. implements the description of specifications after customer's approval.



Title <b>HSX211S</b> <b>QUARTZ CRYSTAL SPECIFICATION</b>				Country of origin <u>TAIWAN / CHINA / THAILAND</u> <b>FACTORY</b>		
Date <b>2014/01/03</b>	Confirm F. S. TSAI	Check Y. W. LEE	Prepare U. F. CHEN	Spec. No. <b>X2C016000B81H-R</b>	Rev. 0	Page 1

# HSX211S SPECIFICATION

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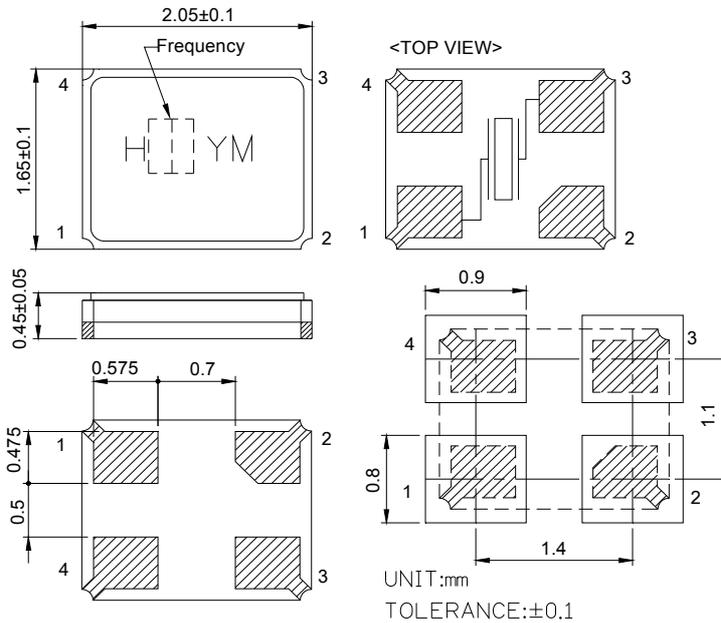
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# 1. QUARTZ CRYSTAL UNIT SPECIFICATION

1. Frequency: 16.000000 MHz
2. Holder type : **HSX211S**
3. Frequency tolerance: +/-10 ppm at 25deg.C +/-3deg.C
4. Equivalent resistance: 200 ohms Max. / SERIES
5. Storage temperature range: -40 deg.C To +85 deg.C
6. Operable temperature range: -20 deg.C To +75 deg.C
7. Temperature drift: +/-10 ppm -20 deg.C To +75 deg.C
8. Loading capacitance (CL) : 8.0 pF
9. Drive level: 10  $\mu$ W (100uW Max)
10. Shunt Capacitance: 2.0 pF Max
11. Insulation resistance : More than 500M ohms at DC 100V
12. Mode of oscillation: Fundamental
13. Circuit: Measured in HP/E5100A,S&A 250B
14. Shocking : Dropping from 120 cm height 3 times on Concrete floor  
Variation : Frequency less than +/-5 ppm  
Resistance less than +/- 15 % or 2 ohms max.
15. Aging: Less than +/- 3 ppm/Year
16. Holder HSX211S Seam type
17. Dimensions and marking Refer to page.4
18. Emboss carrier tape & reel Refer to page.6 and page.7
19. Moisture Sensitivity Level Level 1
20. Note:

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## 2. HSX211S MARKING & DIMENSIONS



Chamfer index mark depends on the ceramic base supplier.

\*Marking should be printed as following

Logo, Nominal Frequency, Manufactured year & month

\*Nominal frequency = integer only

( ex. 14.31818 MHz  $\rightarrow$  14 )

\*Manufacturing Lot No.

(Y: year) ex. 2000 shall be marked as ' 0 ' (As shown on the Table-1)

(M: month) ex. June shall be marked as ' F ' (As shown on the Table-2)

Marking : Laser marking

(Table-1)

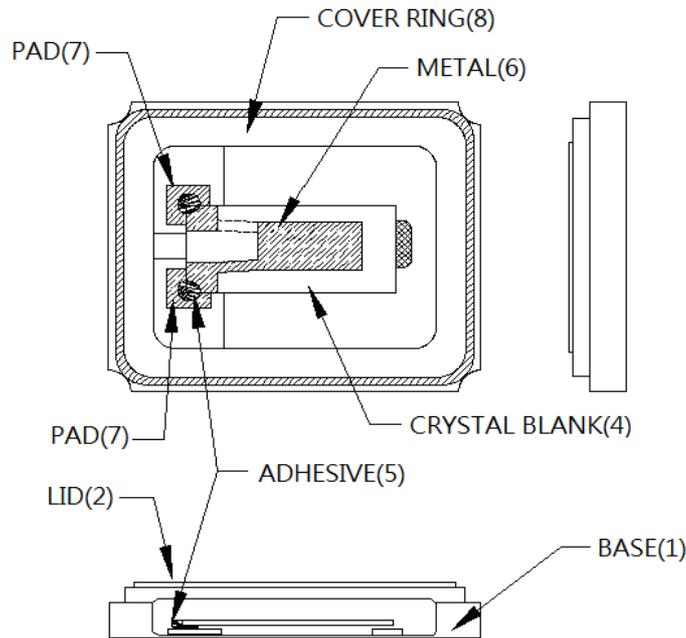
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Code	0	1	2	3	4	5	6	7	8	9

(Table-2)

Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
A	B	C	D	E	F	G	H	J	K	L	M

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### 3. INSIDE STRUCTURE



※Reference drawing

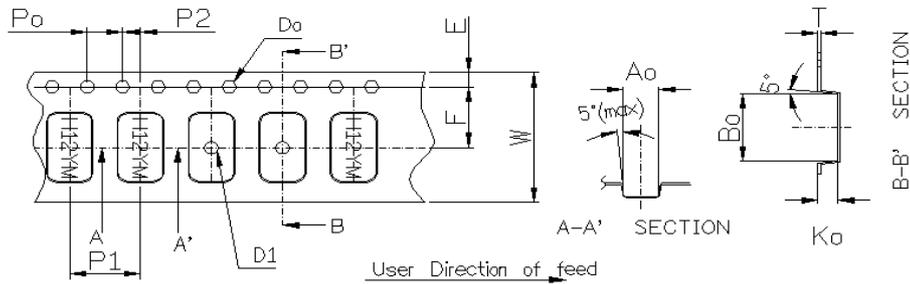
(1) Base	Alumina Ceramic ( $Al_2O_3$ )
(7) Metallized Pad	Mo Ni Plating Au Plating
(2) Lid	Fe- Ni -Co
(3) Crystal Enclosure Seal	Seal Seam
(4) Crystal Blank	Rectangular At-Cut Quartz Crystal Blank
(5) Adhesive	Silver Conductive Silicon Resin
(6) Metal	
(8) Cover Ring	Fe-Ni-Co Alloy

The use prohibition chemistry substance of Table 1 of DHE-0204-1 (HE-QA-24) is not included in this item.

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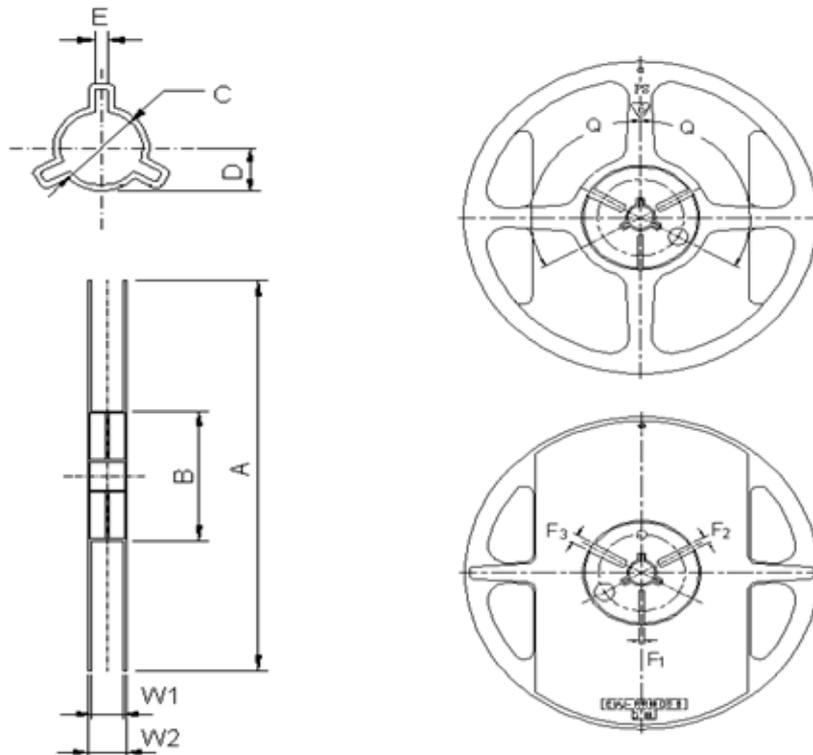
## 4. HSX211S EMBOSS CARRIER TAPE & REEL

### a.) Dimensions of Carrier Tape



Symbol	$A_0$	$B_0$	$K_0$	$P_0$	$P_1$	$P_2$
Spec	$1.9 \pm 0.10$	$2.3 \pm 0.10$	$0.65 \pm 0.10$	$4.0 \pm 0.1$	$4.0 \pm 0.1$	$2.0 \pm 0.05$
Symbol	$E$	$F$	$Do$	$D_1$	$W$	$T$
Spec	$1.75 \pm 0.1$	$3.5 \pm 0.05$	$\phi 1.55 \pm 0.05$	$\phi 1.1 \pm 0.05$	$8.0 \pm 0.2$	$0.25 \pm 0.02$

### b.) Dimensions of Reel



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F. S. TSAI

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Y. W. LEE

Prepare  
U. F. CHEN

Spec. No.  
**X2C016000B81H-R**

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(Table-2)

(UNIT: mm)

ITEM		MARK	DIMENSIONS · ANGLE	
FLANCE	Diameter	A	$\varphi 180+0/-3$	
	Inner Width	W1	$9.3+/-0.3$	
	Outer Width	W2	$11.3+/-1.0$	
HUB	Out Line diameter		$\varphi 60.5+/-0.5$	
	Center Core slit	Width	F1	$3.0+0.5/-0$
			F2	$4.0+0.5/-0$
			F3	$5.0+0.5/-0$
		Position	Q	120deg
	Spindle diameter		C	$\varphi 13.2+/-0.5$
Key Ditch	Width	E	$3.0+/-0.2$	

## c.) Storage condition

Temperature: +40deg.C Max.

Relative Humidity: 80% Max.

## d.) Standard packing quantity

3,000PCS / REEL

## e.) Material of the tape

Tape	Material
Carrier tape	PS Conductive
Top tape	Polyester

## f.) Label contents

	
TYPE:	
SPEC.No.:	
Parts No.:	
LotNo.:	
FREQ.:	MHz
Q'TY:	PCS
HARMONY ELECTRONICS CORP. (H.ELE.) HSF	

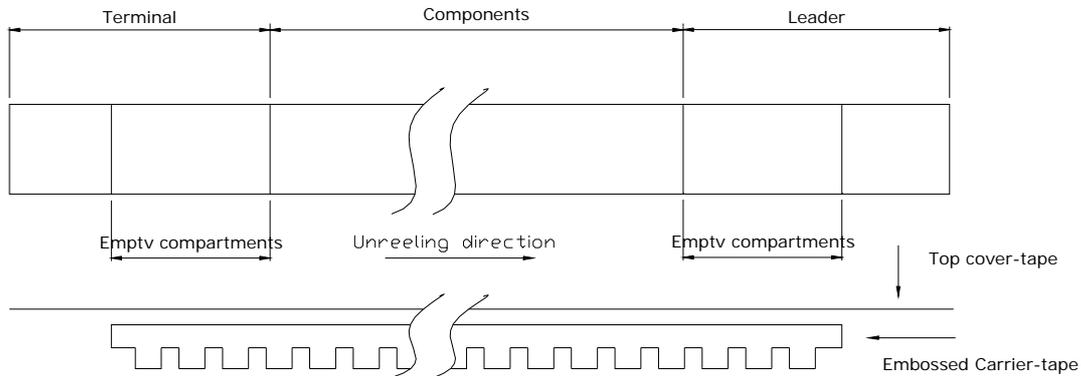
Sticks label for every reel.

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g.) Taping dimension

Leader	Cover-tape	The length of cover-tape in the leader is more than 400 mm including empty embossed area.
	Carrier-tape	After all products were packaged, must remain more than twenty pieces or 400 mm empty area, which should be sealed by cover-tape.
Terminal	Cover-tape	The tip of cover-tape shall be fixed temporary by paper tape and roll around the core of reel one round.
	Carrier-tape	The empty embossed area which are sealed by top cover-tape must remain more the 40 mm.



h.) Joint of tape

The carrier-tape and top cover-tape should not be jointed.

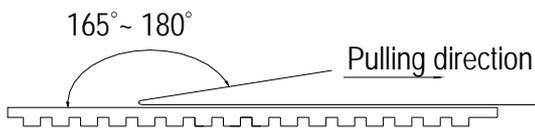
i.) Release strength of cover tape

It has to between 0.1N to 0.7N under following condition.

Pulling direction 165° to 180°

Speed 300mm/min.

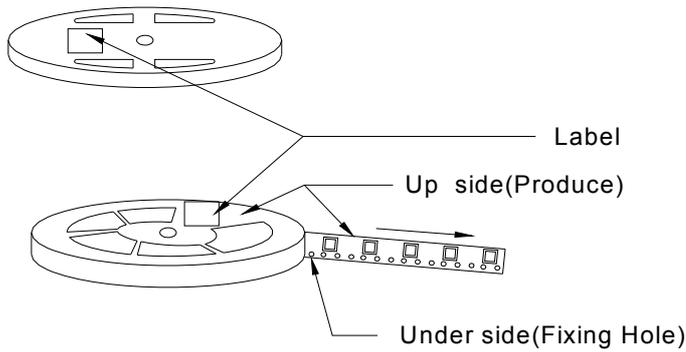
Otherwise unless specified.



Other standards shall be based on JIS C 0806-1990.

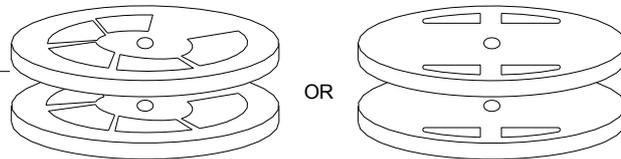
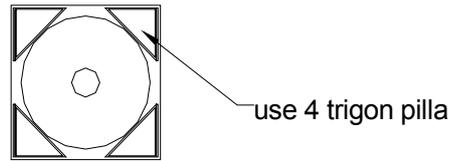
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j.) Package

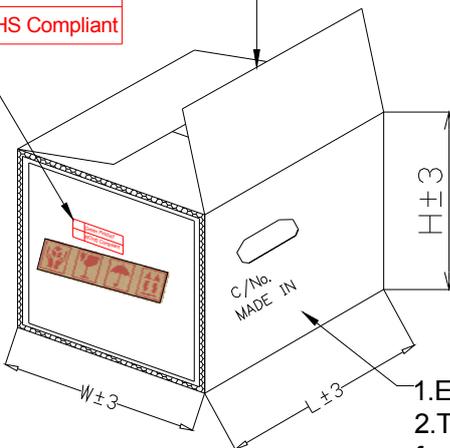


One reel quantity: [1000pcs]&[3000pcs]

- ① Top and bottom with 2.3cm thickness foam-rubber cushion for protection.
- ② Carton's Q'TY: 1~15 pcs.
- ③ Carton Type=A,B,C use 4 trigon pillar to fasten the Reel.
- ④ Need to add 3 pages dry agent in each outer box.



Green Product  
ROHS Compliant



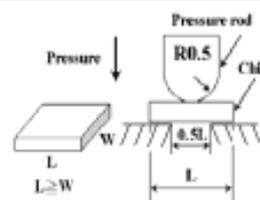
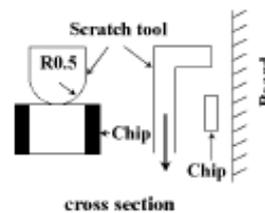
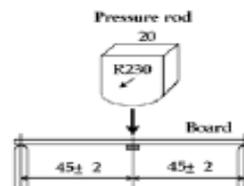
Carton Type	A	B	C	D
Produce Type	840/751	630/531/ 421	321/221 211/111	OTHER
Reel	15	15	15	1~7
L±3	200	200	200	195
W±3	200	200	200	195
H±3	230/260	230	230	150

- 1. Every Carton with 3 desiccant.
- 2. Top and bottom with 2.3cm thickness foam-rubber cushion for protection

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## 5. Mechanical Performance

Item		Test Methods	Specifications Code
1	Natural Drop	Dropping from 120 cm height 3 times on Concrete floor	A
2	Vibration	Frequency 10-55Hz, Sine Wave full amplitude of 0.8mm to X, Y and Z 3 axes, Duration of 120min. to each direction.	A
3	Sealing Tightness	(1) Dipping in the FC-40 at +125 +/-5deg.C for 5 minutes, no gas bubble observed from the inside of the can. (2) Leak Rate $1.0 \times 10^{-8}$ Pa-m <sup>3</sup> /sec. Max. measured by Helium leak detector. Also, no serial bubble is observed by Fluor inert tests.	---
4	Solderability	After applying ROSIN Flux, dipping in solder bath at 245deg.C +/-5deg.C for 3 +/-0.5 sec.	B
5	Substrate Bending	Mount a sample on board. Apply Pressure to the center of board until it is bent to 3 mm and hold for 5 ±1 sec Pressure speed :0.5 mm / sec	A
6	Adhesion	Mount a sample on the circuit board. Apply pressure vertically to the side of specimen attached to the circuit board with the pressure jig. Pressure : 5N for 10 +/-1 sec	A
7	Body strength	Apply pressure to the center of body with the R0.5 pressure jig. pressure :10N for 10 +/-1sec	A



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## 6. Environment Performance

Item		Test Methods	Specifications Code
1	Humidity	Temperature 60°C +/-2°C, RH 90~95%, Duration of 240 hours. Back to room temperature first, then in 1~2 hours, the component shall be checked.	A
2	Storage in Low Temperature	-40deg.C +/-2deg.C, Duration of 240 hours. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A
3	Storage in High Temperature	+85deg.C +/-2deg.C, Duration of 240 hours. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A
4	Temperature cycles	-40deg.C +/-2deg.C (30min) ↔ +85deg.C +/-2deg.C (30min) 25 cycles. Back to the room temperature first, then in 1~2 hours, the component shall be checked.	A

Specifications code	Specifications
A	Frequency variation shall be within +/-5ppm and equivalent resistance shall be within +/-15% or 2Ω
B	More than 90% of lead shall be covered by new solder.

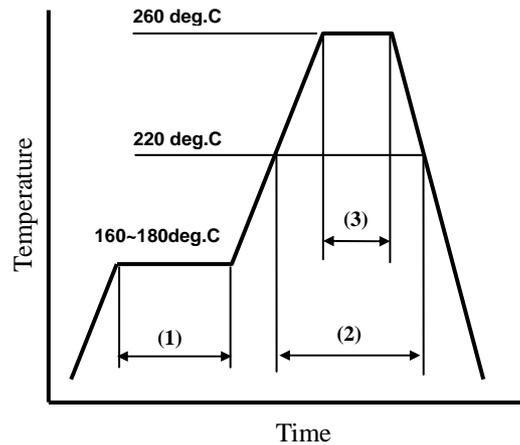
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## 7. Supplement

### 7.1.Soldering

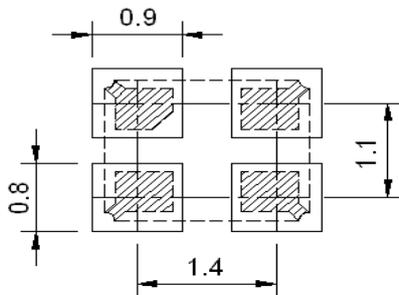
7.2.Please stay with our proposed reflow condition and do then soldering 2 times max.

*Available for Lead Free Soldering*



(1)	Preheat	160~180 deg.C	120sec.
(2)	Primary heat	220 deg.C	60sec.
(3)	Peak	260 deg.C	10sec. Max.

### 7.3.Land pattern layout(Example)



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#### 7.4.Solder iron (Example)

Bit temp.:350°C max.,Time:3sec max. ,Each terminal solder a 1 time max.

#### 7.5.Mounting

This component is designed for automatic insertion.

However, you are requested to do the trial with your insertion machine in order to be sure of proper operation and no damage of component.

Please pay attention to board warp which may damage the component and cause Soldering Process.

#### 7.6.Cleaning

Cleaning liquid which corrodes Nickel shall not be used

It may cause the problem on the surface, color, marking etc.

Ultra-sonic cleaning is possible, however, you are requested to check on your board. Because we only checked as single unit.

#### 7.7.Storage

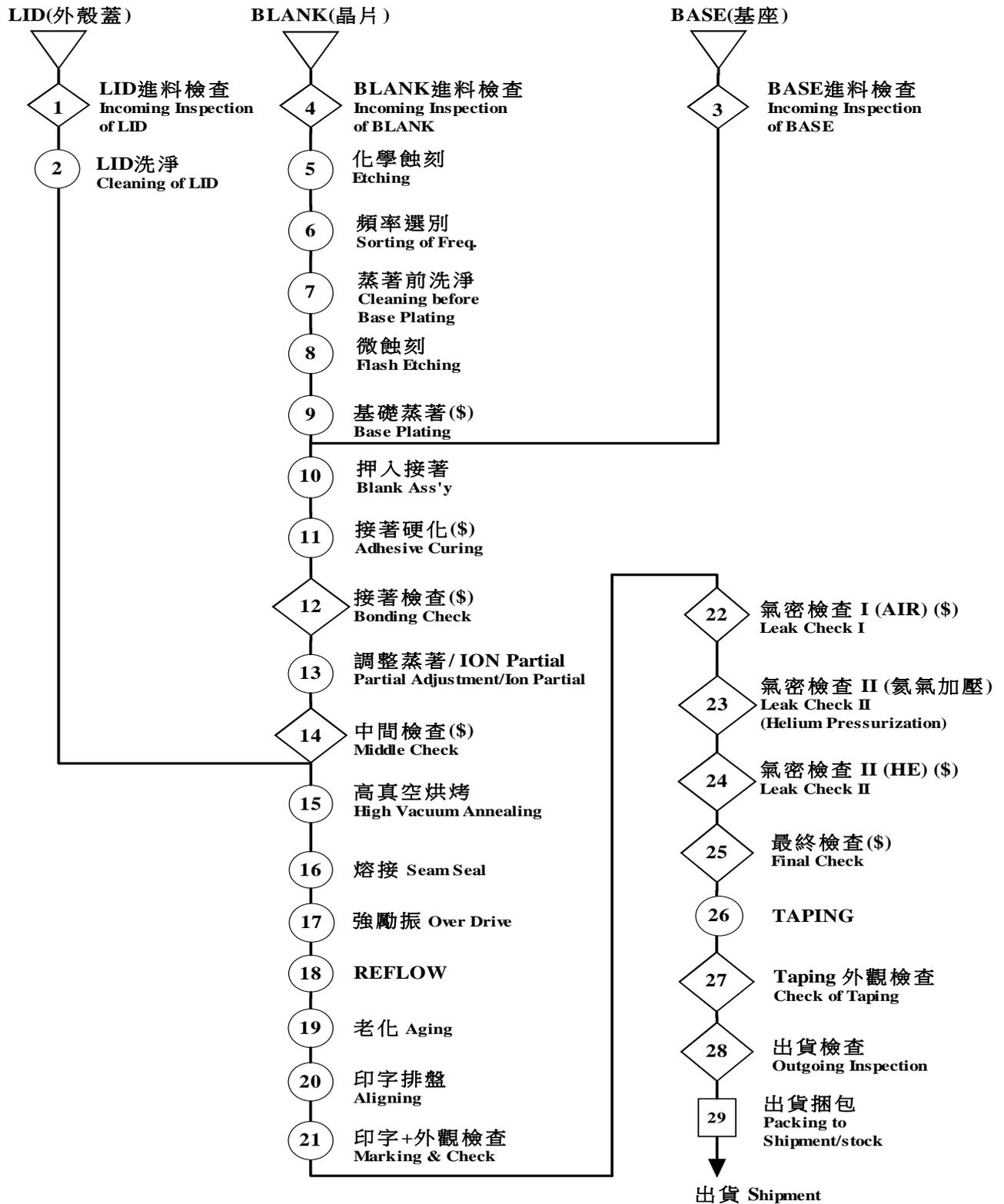
Please keep away from high temperature and high humidity ,which may cause put solderability.

No direct Sunlight, No dew as well.

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# 8. Flow Chart



(\$): 特殊特性  
(For Special Characteristics)

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