



Shenzhen Jolly Technology Co.,LTD

PCBA Incoming Material Inspection Standard

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Referenced Standard: IPC-A-610 J version "Acceptability of Electronic Assemblies"

Acceptance Level: Class 2

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1. General Provisions

1.1 Purpose

Standardize the incoming inspection of outsourced/purchased PCBA finished products, unify inspection standards and judgment criteria, and ensure that products meet the requirements of IPC-A-610 J version Class 2.

1.2 Scope of Application

This applies to incoming material inspection of all PCBA finished products purchased or outsourced by our company. If there are special requirements in the drawings/customer agreements, the customer's requirements shall be given priority.

1.3 Core Judgment Rules

Determination type	definition	Disposal methods
Qualification items	It fully complies with this specification and IPC-A-610 J version Class 2 acceptable standards, with no functional or reliability risks .	Directly put into storage and released .
Process warning items	Non-defect-related process deviations do not affect electrical functions, assembly, or long-term reliability .	Do not refuse to accept the goods; include them in supplier management and require optimization and improvement .
Non-conforming items	Violating Class 2 requirements poses a risk of functional failure, security vulnerabilities, or decreased reliability .	The product will be rejected and handled according to the procedures for non-conforming products .

2. Referenced files

- IPC-A-610 J version "Acceptability of Electronic Assemblies"
- IPC J-STD-001 Requirements for Welded Electrical and Electronic assemblies
- GB/T 2828.1-2012 Inspection Procedures by Attributes – Part 1: Sampling Schemes Retrieved by Acceptable Quality Limit (AQL) for Lot-by-Lot Inspection
- Nonconforming Product Control Procedure

3. Testing environment and sampling plan

3.1 Requirements for the testing environment and personnel

project	Require
Temperature and humidity	Ambient temperature: 18~28℃; relative humidity: 30%~70%.
Illumination	The test surface has a lux rating of ≥500 lux and is free from direct sunlight/reflection.
Magnification	For routine visual inspection, magnification is 1-3 times; for minute pins/pitch, refer to Appendix 1 for adaptation; for arbitration inspection, magnification is ≤20 times.
Personnel Qualifications	Having passed the IPC-A-610J standard training and obtained certification to work, and being proficient in the Class 2 judgment rules.
Equipment Requirements	The multimeter, withstand voltage tester, X-ray machine, and other testing equipment are all within their calibration validity period.

3.2 Sampling Rules

- Batch definition: PCBAs of the same model, production batch, and delivered in the same batch constitute one inspection batch.
- Sampling plan: Implement GB/T 2828.1 Single sampling plan for normal inspection, inspection level II.
- Defect classification and AQL value:

Defect Classification	definition	AQL value	Inspection requirements
Critical Defect (CR)	Defects that lead to safety accidents, complete product failure, or violations of regulations.	0	100% full inspection
Major Defect (MA)	Defects that cause product malfunctions, significantly reduced reliability, and inability to assemble.	0.65	Implement according to the sampling plan.
Minor defect (MI)	It does not affect functionality, assembly, or reliability; it is only an appearance defect.	2.5	Implement according to the sampling plan.

4. Inspection Standards

4.1 PCB substrate inspection

Inspection items	Class 2 Qualification Standards	Reject Criteria	Defect Classification
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Substrate body	No delamination, bubbling, white spots, or cracks; no exposed fibers in the substrate .	Delamination, bubbling, cracking, exposed fibers in the substrate	MA
Warp	Insert parts $\leq 1.5\%$, surface mount parts $\leq 0.75\%$, which does not affect assembly and welding .	Excessive warpage affects assembly/welding.	MA
solder mask	No peeling, blistering, or lifting; solder mask offset at the pad edge $\leq 0.05\text{mm}$; no exposed pads .	Solder mask peeling, blistering, exposed pads, bridging adjacent pads	MA
silkscreen layer	The model number, tag number, and polarity are clearly identifiable and do not cover pads or vias .	The silkscreen printing is blurry and unreadable, covering the pads/vias.	MI/MA
Metal plating	The solder pads and hole walls are free from oxidation, blackening, and exposed copper, and have good solderability .	Oxidized pads, exposed copper, and no plating on the hole walls.	MA
Hole position and shape	Mounting holes, positioning holes, and external dimensions conform to the tolerances in the drawings .	Dimensions are out of tolerance and cannot be assembled.	MA

4.2 Inspection of component installation and soldering

4.2.1 General Welding Requirements

Inspection items	Class 2 Qualification Standards	Reject Criteria	Defect Classification
Solder wetting	The solder completely wets the pads and component leads, with a wetting angle $\leq 90^\circ$ and a clear outline .	Non-wetting, dewetting, cold solder joint, incomplete solder joint, solder cracking	CR/MA
Solder filler	The solder completely wets the hole wall of the through-hole component,	No wetting on the hole walls, insufficient solder	MA

	forming a complete solder ring on the top surface, and the back side is filled with $\geq 75\%$ of the hole wall .	filling, blowholes/voids exceeding 25% of the pad size.	
Welding abnormality	No solder bridging, solder balls, or solder tips; movable solder ball diameter $\leq 0.13\text{mm}$ and does not violate minimum electrical clearance .	Solder bridging, movable solder balls, and solder tips can affect assembly/insulation.	CR/MA
Post-weld damage	The components and PCBs showed no signs of overheating, discoloration, pin deformation, or package damage .	Damaged component packages, broken leads, and peeling or detached PCB pads.	CR/MA

4.2.2 Specific Requirements for Typical Components

Component types	Class 2 Qualification Standards	Reject Criteria	Defect Classification
Surface mount components (resistors/capacitors)	1. No tombstone erection, flipping, or shifting; 2. The end welding width is $\geq 50\%$ of the component width, and the side welding height is $\geq 1/2$ of the component thickness .	Tombstone erection, flipping, solder tip completely detached from pad, solder width $< 25\%$ of component width	MA
Through-hole insert	1. The pins extend $0.4\sim 2.5\text{mm}$ beyond the pads, with correct polarity/direction; 2. The component body should be flush against the PCB with a gap of $\leq 0.5\text{mm}$.	Reverse polarity, pin too long/too short, floating height out of tolerance, pin not extending beyond the pad.	CR/MA
Gull-wing pin IC (SOIC/QFP)	1. Pin coplanarity $\leq 0.1\text{mm}$, no offset or tilting; 2. The side soldering length is $\geq 75\%$ of the pin width, and the heel is well	Pin lifting, bridging, lack of wetting at the base, pin offset exceeding 50% of the pad.	CR/MA

	wetted .		
BGA/CSP	1. The solder balls are free of bridging, voids, and misalignment; X-ray inspection shows voids $\leq 25\%$ of the solder ball diameter. 2. The solder balls have good coplanarity, with no cold solder joints or incomplete solder joints .	Solder ball bridging, offset exceeding 25%, solder ball diameter, voids exceeding 25%, cold solder joints/open circuits.	CR/MA
Polar element	The polarity markings are completely consistent with the PCB silkscreen, with no reversal .	polarity opposite	CR

4.3 Cleanliness and Protective Equipment Inspection

Inspection items	Class 2 Qualification Standards	Reject Criteria	Defect Classification
Cleanliness	The board surface is free of residual flux, solder dross, debris, fingerprints, and corrosive residue.	Sticky flux residue, solder dross/debris residue, board surface corrosion	MA
Protection	Gold fingers, connectors, and sensitive components are effectively protected from scratches, oxidation, and deformation.	Scratched gold fingers, deformed connector pins, and damaged sensitive components due to lack of protection	MA
Conformal coating	For applications requiring coating, the coating should be uniform, without any missed areas, bubbles, or runs, and should not cover connectors or solder pads.	Incomplete coating, covering of solder pads/connectors, large-area bubbles/sagging.	MA

5. Electrical performance testing requirements

Test Project	Class 2 Test Requirements	Test frequency	Defect
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			Classification
Connectivity test	No open circuits or miswiring; resistance values meet drawing requirements.	100% full inspection	CR
Insulation withstand voltage test	Standard requirements: 500V DC/1min, no breakdown or arcing, insulation resistance $\geq 100M\Omega$	According to the drawing requirements / sampling	CR/MA
Functional testing	Complete full-function testing using the test fixtures/programs; no functional failures were found.	Execute according to customer/drawing requirements.	CR

6. Rules for the Control of Non-conforming Products

- If any defective products are found during inspection, immediately affix a "Defective" label, isolate and store them, fill out the "Incoming Material Defective Handling Form," and prohibit them from entering the warehouse;
- Batches with fatal defects will be rejected outright. Batches with serious defects will be reviewed and returned/reworked. Batches with minor defects may be accepted on a special basis (only for one time, and will be included in the supplier evaluation).
- Reworked batches must undergo full inspection again before they can be put into storage. Each batch is allowed to be reworked a maximum of 1 time.
- All incoming material inspection and non-conforming handling records are archived for ≥ 3 years to achieve batch traceability.

7. Appendix

Appendix 1: Magnification Compatibility Test Table

Pin pitch / Line width	Routine inspection of magnification	Arbitration inspection magnification
$\geq 0.65mm$	1~3 times	4 times
0.3~0.65mm	4~10 times	10 times
$< 0.3mm$	10~20 times	20 times

8. Record Form:

Incoming Material Inspection Record Form