

Recommendations/Comments for "IPC 1601"

(Implementation subject to customer/supplier agreement)

Objective: Feasible implementation of the directive in line with requirements

IPC chap.	Requirement	Comment / Remark
3.1.1	<ul style="list-style-type: none"> a. Handle PP + resin-coated films with gloves only at the edges a. Reseal opened PP bags b. Store PP + and resin-coated films at < 23°C and < 50% of humidity c. Acclimate PP + resin-coated films if storage temp. is less than room temperature. d. Process control (storage, place of use, transport route) via temperature and moisture indicators 	<ul style="list-style-type: none"> a. Handle such that adverse effects on product quality and functionality are prevented. b. Only if climate of storage room is not controlled. c. Storage conditions must be agreed or qualified with the manufacturer of the material. d. Any existing temperature differences should taken into account in qualification. e. Monitor room climate via temperature and moisture indicators.
3.1.2	Do not mix different resin types	Material storage should be organized accordingly.
3.2.3	Brief period between drying and pressing (moisture absorption). Before packaging/equipping, remove moisture.	Any residual moisture that may be present should be evaluated during qualification.
3.2.3.2	<p>Determine the degree of moisture of the etched cores according to IPC TM 650, Method 2.6.28.</p> <p>Insert cores separately, dry at 105°C – for 30 min.</p> <p>Drying of stacked cores: Max. height: 25.4 mm Temp. stack center: 105°-120°C Time: 2 hours.</p>	In interim storage, ensure low absorption of moisture.

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3.2.3.3	Item 3.2.3.2 also valid for multiply pressed PCBs. Drying: 180° C - 2 hours or 150° C - 8 hours or 120° C - 24 hours	In interim storage, low absorption of moisture should be ensured.																								
3.3.2	Handle pressed panels/PCBs with gloves.	Avoid fingerprints by using suitable methods.																								
3.3.3	Monitoring of temperature and moisture during the processes. Drying prior to plating and LSL.	The process parameters should be defined such that adverse effects are prevented.																								
3.3.6	Moisture 0.1 to 0.5 %, based on the resin weight.	Drying of the PCBs by the manufacturer: -> Artificial aging of the soldering surface -> Impairment of solderability/storage time. It is recommended to carry out the drying process immediately prior to the soldering process.																								
3.4.4	Drying temperatures according to Table 3-1 <table border="1" data-bbox="112 1071 821 1299"> <caption>Table 5-1 Recommendations for Printed Board Baking Profiles</caption> <thead> <tr> <th>Final Finish</th> <th>Temperature</th> <th>Time</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>Tin</td> <td>105 – 125 °C</td> <td>4-6 Hours</td> <td>Higher temperature may reduce solderability</td> </tr> <tr> <td>Silver</td> <td>105 – 125 °C</td> <td>4-6 Hours</td> <td>Silver may tarnish, but solderability should not be affected</td> </tr> <tr> <td>Nickel/Gold</td> <td>105 – 125 °C</td> <td>4-6 Hours</td> <td>No issue with extended bake on Nickel/Gold finish</td> </tr> <tr> <td>Organic Coating</td> <td colspan="3">See 5.1.1</td> </tr> <tr> <td>HASL/HAL</td> <td>105 – 125 °C</td> <td>4-6 Hours</td> <td>Final surface thickness below 30 µin may turn into pure intermetallics and render the printed board unsolderable</td> </tr> </tbody> </table>	Final Finish	Temperature	Time	Comments	Tin	105 – 125 °C	4-6 Hours	Higher temperature may reduce solderability	Silver	105 – 125 °C	4-6 Hours	Silver may tarnish, but solderability should not be affected	Nickel/Gold	105 – 125 °C	4-6 Hours	No issue with extended bake on Nickel/Gold finish	Organic Coating	See 5.1.1			HASL/HAL	105 – 125 °C	4-6 Hours	Final surface thickness below 30 µin may turn into pure intermetallics and render the printed board unsolderable	Individual definition of the drying conditions through type-specific qualification at the end user.
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4.1.1.	Dry polyamide material prior to packaging. For packaging, use: <ul style="list-style-type: none">- Vacuum-sealed moisture barrier bags- Moisture indicators- Desiccants.	Drying of the PCBs by the manufacturer results in: -> Artificial aging of the soldering surface -> Impairment of solderability/storage time. It is recommended drying them immediately prior to equipping.
4.1.2	Include rigid reinforcement sheet when packaging: <ul style="list-style-type: none">- Thin PCBs (< 1.40 mm)- Flexible PCBs- PCBs with complex milling pattern.	To avoid mechanical impact, a suitable packaging should be selected.
4.1.5	Packing material ESD-compliant.	Which packaging material is used, should be agreed between user and supplier. ESD-compliant packaging for bare PCBs is price-relevant.
4.2.1	Water vapor penetration rate of the packaging: $\leq 0.002 \text{ mg} / 100 \text{ inches}^2 / 24 \text{ hours}$	Which packaging material is used, must be agreed between customer and PCB manufacturer.
4.2.2	Use a packaging material with metallic interlayer, in particular for lead-free PCBs (moisture).	Which packaging material is used, must be agreed between customer and PCB manufacturer.
4.2.3 and 4.2.4	Desiccant and moisture indicators according to IPC-J-STD-033.	Qualification must be agreed between customer and supplier.

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4.2.5	Determination of moisture by "lamine test coupons".	Who provides the coupons must be agreed between supplier and customer.
4.3.1.2	Use sulfur-free and pH-neutral packaging material for chem. Ag.	Use a packaging material that does not have any adverse effects on solderability / storage time.
4.3.1.3	When vacuum sealing, do not remove air completely. The function of the desiccant will be impaired.	The degree of vacuum must have been optimized by the PCB manufacturer: <ul style="list-style-type: none"> - To achieve mechanical stability of the packaging - To achieve good functionality of the desiccant.
4.3.1.4	Include a desiccant in the moisture barrier bag next to the PCBs.	No adverse effects caused by the positioning of the desiccant on: <ul style="list-style-type: none"> - Solderability - Effectiveness of the desiccant - Mechanical impact on the PCBs. The addition of desiccant should be agreed between supplier and customer.
4.3.1.5	For PCBs $\leq 144 \text{ inches}^2$ (0,09 m ²) = 25 PCBs / delivery unit per package. For PCBs $> 144 \text{ inches}^2$ (0.09 mm ²) = 10 PCBs / delivery unit per package.	The number of PCBs in a packaging unit depends on the PCB size, PCB thickness and the structure of the circuit. The supplier should establish a suitable package size.

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4.4.2	The package of ESD-sensitive printed circuit boards should be labeled according to ANSI, including ESD protection symbol. 	Which packaging label is used, must be agreed between customer and PCB manufacturer.
4.4.3	PCBs contained in dry packaging should bear a label referring to moisture or the symbol shown below. 	Which packaging label is used, must be agreed between customer and PCB manufacturer.
5.	Goods receipt, storage and equipping of printed circuit boards	Does not affect manufacturers of bare printed circuit boards