

## Lead free plating evaluation

### Introduction

The standard plating on electronic components has been tin-lead alloys. As the industry moves towards lead-free components, new materials have to be used in plating process. After the evaluation of the different alloys, the choice of PRECI-DIP is pure tin. This document specifies, in accordance with the IPC/JEDEC Standard J-STD-020C, the test requirements for lead-free component finishes.

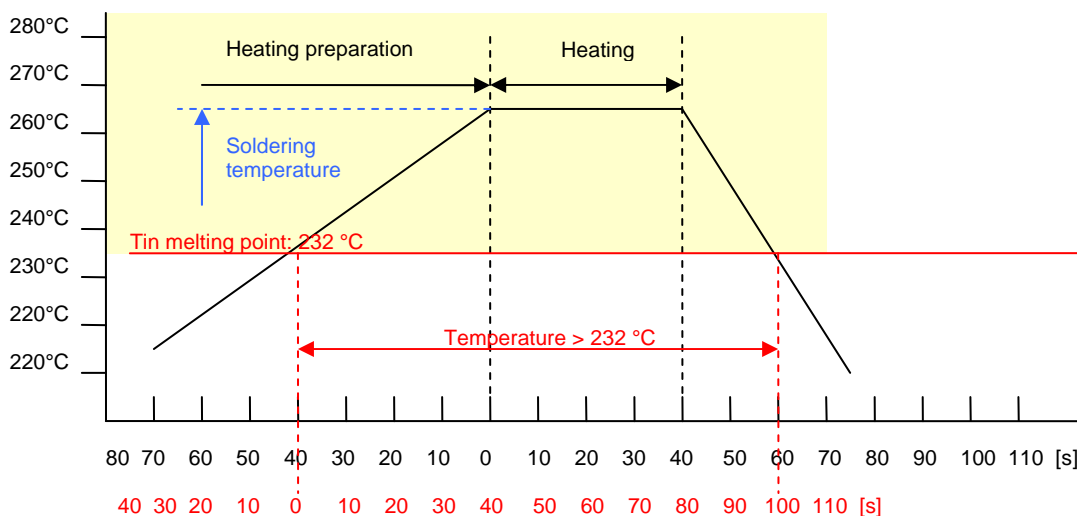
## 1. Resistance to soldering heat

### 1.1 Samples description

Sample	Part reference	Plating	Nickel [ $\mu\text{m}$ ]	Tin [ $\mu\text{m}$ ]
S1	01001-80	Pure-Tin PRECI-DIP BT-280	2.5	5
S2	01465-80	Pure-Tin PRECI-DIP BT-280	2.5	5
S3	10101-80	Pure-Tin PRECI-DIP BT-280	2.5	5

### 1.2 Test conditions

#### 1.2.1 Heating curve



#### 1.2.2 Test procedure

To simulate the standard heating curve, parts are placed in an oven during 300 s at 265 °C.

- 1) Oven programming (temperature 265 °C).
- 2) Start heating.
- 3) Upon temperature stabilization at 265 °C, samples are placed in the oven.
- 4) After 5 min, samples are removed from oven.
- 5) Samples evaluation after cooling.



### 1.3 Samples evaluation

After test, samples are submitted to a visual inspection to ensure no discoloration of the tin plating aspect.

### 1.4 Results

Test condition [°C]	Exposure time [sec]	Sample number	Discoloration [%]
265	300	S1	0
265	300	S2	0
265	300	S3	0

## 2. Solderability test

### 2.1 Samples description

Sample	Part reference	Plating	Nickel [µm]	Tin [µm]
S1	00903-80	Pure-Tin PRECI-DIP	2.5	5
S2	01001-80	Pure-Tin PRECI-DIP	2.5	5
S3	01015-80	Pure-Tin PRECI-DIP	2.5	5
S4	01303-80	Pure-Tin PRECI-DIP	2.5	5
S5	01401-80	Pure-Tin PRECI-DIP	2.5	5
S6	01465-80	Pure-Tin PRECI-DIP	2.5	5
S7	02301-80	Pure-Tin PRECI-DIP	2.5	5

### 2.2 Test conditions and procedure

#### 2.2.1 Samples ageing

Before the solderability test, all samples are submitted to an 8h steam ageing in accordance with J-STD-002A Category 3. The specimens are suspended with the termination vertically, with the area to be tested positioned 25 to 30 mm above the surface of boiling distilled water ( $91 \pm 3$  °C) which is contained in a borosilicate glass. The termination shall not be less than 10 mm from the walls of the vessel and the specimens holder shall be non-metallic. The level of water shall be maintained by the addition of hot distilled water. After conditioning, specimens are dried in an oven at 100 °C during 1 hour.

#### 2.2.2 Description of the solder bath

The solder bath shall not be less than 40 mm in depth and not less than 300 ml in volume. The bath shall contain solder as specified (SnAg3.8Cu0.7) and the temperature prior to the test shall be  $245 \pm 5$  °C.

#### 2.2.3 Flux description

The flux to be used shall consist of 25 % by weight of colophony and of 75 % by weight of isopropanol or ethyl alcohol. (MIL-F-14256)

#### 2.2.4 Test procedure

The surface of the molten solder shall be wiped clean immediately before each test. The contact to be tested shall be immersed first in flux at laboratory temperature, and excess flux shall be eliminated. The contact is then immersed immediately in the solder bath in the direction of its longitudinal axis. The point of immersion of the



contact shall be at a distance not less than 10 mm from the walls of the bath. The speed of immersion shall be  $25 \pm 2.5$  mm/s and the contact shall remain immersed for  $5 +0/-0.5$  s.

### 2.3 Samples evaluation

Criteria for acceptable solderability :

- The dipped portion of the contact is at least 95 % covered by a continuous new solder coating.
- Pinholes, voids, porosity, nonwetting or dewetting are not concentrated in one area and do not exceed 5 % of the total area.

### 2.4 Results

Test condition [°C]	Exposure time [sec]	Sample number	Solderability
245	10	S1	Ok
245	10	S2	Ok
245	10	S3	Ok
245	10	S4	Ok
245	10	S5	Ok
245	10	S6	Ok
245	10	S7	Ok

### 3. Conclusion

- All samples have been submitted to the solderability test in accordance with the norm IEC 60068-2-20 Ta method 1. Results do not show any defect due to plating. No voids, pinholes, nonwetting or dewetting area have been observed. Contacts are covered by a continuous solder coating.

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