ASAHI SOLDER
SYMBOL OF QUALITY

# Pb free SnCu0.7 (CLF5033)

**Halide Free No Clean Core Wire**

RoHS compliant

## INTRODUCTION

With implementation of stringent manufacturing process, Asahi has developed a wide range of wires with diverse alloys and flux types to meet the varying requirements of specialised applications. SnCu0.7 (CLF5033) lead free no clean core flux solder wire is formulated using purest raw chemicals together with halide-free materials, which guarantees absolute flux core continuity and consistency in solder properties. It provides excellent instant wetting action and superior solderability on a variety of surface finishes. It is low smoke, low spattering, less odor and no charring on solder iron tip. The residue of this core flux is transparent with a pale yellowish tint.

## SPECIFICATIONS

| Item | Specifications | Test Standards |
|---|---|---|
| Flux Content | 3.0 +/- 0.5 wt% | Singapore Asahi |
| Density of Cored Flux @ 25°C | 1.124 | Singapore Asahi |
| Halide Content | 0 wt% | IPC-TM-650 2.3.35B<br>JIS Z 3197: 1999 8.1.4.2.2 |
| Water Extract Resistivity | >1.0 x$10^4$ Ω-cm | JIS Z 3197: 1999 8.1.1 |
| Surface Insulation Resistance (Raw Flux)<br>(85°C, 85 %RH, 1000hrs) | >1x$10^8$ Ω<br>>1 x$10^{11}$ Ω | IPC-TM-650 2.6.3.3<br>JIS Z 3197: 1999 8.5.4 |
| Copper Corrosion Test | Pass | IPC-TM-650 2.6.15<br>JIS Z 3197: 1999 8.4.1 |
| Copper Mirror Test | Classified as “M”, Pass | IPC-TM-650 2.3.32<br>JIS Z 3197: 1999 8.4.2 |
| Flux Activity Classification | ROM0 | IPC J-STD-004A |
| Spread Factor | >80% (SnCu0.7) | JIS Z 3197: 1999 8.3.1.1 |
| Residue Dryness Test | Dry | JIS Z 3197: 1999 8.5.1 |
| Residue Appearance | Transparent & Minimal | Visual |

## ALLOY SPECIFICATION

| Composition | | IPC J-STD-006B Specs (Wt%) |
|---|---|---|
| Tin | Sn | Remainder |
| Copper | Cu | 0.7 +/- 0.1 |
| | | |
| **Contamination** | | |
| Silver | Ag | 0.10 max |
| Aluminium | Al | 0.005 max |
| Arsenic | As | 0.03 max |
| Gold | Au | 0.05 max |
| Bismuth | Bi | 0.10 max |
| Cadmium | Cd | 0.002 max |
| Iron | Fe | 0.02 max |
| Arsenic | In | 0.10 max |
| Nickel | Ni | 0.01 max |
| Lead | Pb | 0.05 max |
| Antimony | Sb | 0.05 max |
| Zinc | Zn | 0.003 max |

## PHYSICAL PROPERTIES

| | *SnCu0.7* |
|---|---|
| Melting Temperatures | 227$^{o}$C |
| Coefficient of Thermal Expansion | 19.3 µm/m$^{o}$C |
| Density | 7.31 g/ml |

## MECHANICAL PROPERTIES

| | *SnCu0.7* |
|---|---|
| Tensile Strength | 44.35 MPa |
| Yield Strength | 37.31 MPa |
| Young's Modulus | 10.6 GPa |

## APPLICATION

SnCu0.7 (CLF5033) lead free no clean core flux solder wire is easy to use for automatic, manual, rework, point and brush soldering. For the best soldering results, the recommended parameters are shown:

| | |
|---|---|
| Solder Iron Tips: | All Types especially the tapered types |
| Soldering Temp: | > 350 $^{o}$C |
| Soldering Time: | 1 ~ 3 secs |

- Keep solder iron tips clean.
- Tinned iron tips before use.
- Wear gloves when soldering to avoid contaminating the wire.

(Note: Soldering parameters are dependent on tip type, soldering station wattage configuration, wire diameter and type of applications.)

## PACKAGING

SnCu0.7 (CLF5033) lead free no clean core flux solder wire is commonly available in various diameters such as 0.5, 0.6, 0.8, 1.0, 1.2, 1.6 and 2.0 mm. For different diameters, please specify your requirements.

| Packaging | 0.25kg | 0.50kg | 1.0kg |
|---|---|---|---|
| Diameter (mm) | 0.5 to 2.0 | 0.5 to 2.0 | 0.8 to 2.0 |

## RESIDUAL REMOVAL

Since the residues are transparent, minimal, dry, non-tacky and practically inert after soldering, removal is usually not necessary. For assemblies that require cleaning, the residue of SnCu0.7 (CLF5033) lead free no clean core flux solder wire can be completely removed by any solvent type flux cleaner available in the market.

## SAFETY

Wear a chemical mask if the operators are allergic to the fumes released during soldering. For more information, please refer to Material Safety Data Sheet.

## STORAGE

Store the solder wire in a cool, dry environment. Wrap up the solder wire when not in use to reduce exposure to environment. SnCu0.7 (CLF5033) lead free no clean core flux solder wire can be kept for 2 years if proper storage conditions are observed.

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# TEST ANALYSIS

Various tests were conducted to evaluate the performance and reliability of CLF5033 core flux.

## HALIDE CONTENT

This test is to determine the amount of halide present in the core flux.

**Method:**

By titration method with end point determination. The % chlorides calculated based on the following formula:

$$\text{Halides, as \% Chlorides} = \frac{3.55\ VN \times 100}{ms}$$

**Result:**
Halide Content = 0 wt%.

## WATER EXTRACT RESISTIVITY

This test measures the corrosiveness of the flux.

**Method:**

- Take an amount of the flux containing solid portion equivalent to 0.05 ± 0.005g as the sample.
- Put the sample in a beaker with 50ml of purified water. Cover the beaker with a watch glass.
- Heat and boil it for about 5 mins, and further continue heating for about 1 min.
- Cool the beaker for about 10 secs at room temperature, then place beaker in a water bath of about 20°C to obtain the test solution, immediately measure the resistance of this water solution using a conductivity meter.

**Result:**
The test result obtained is $2.23 \times 10^5$ Ω-cm, which meets the minimum required specific resistance of $1.0 \times 10^4$ Ω-cm.

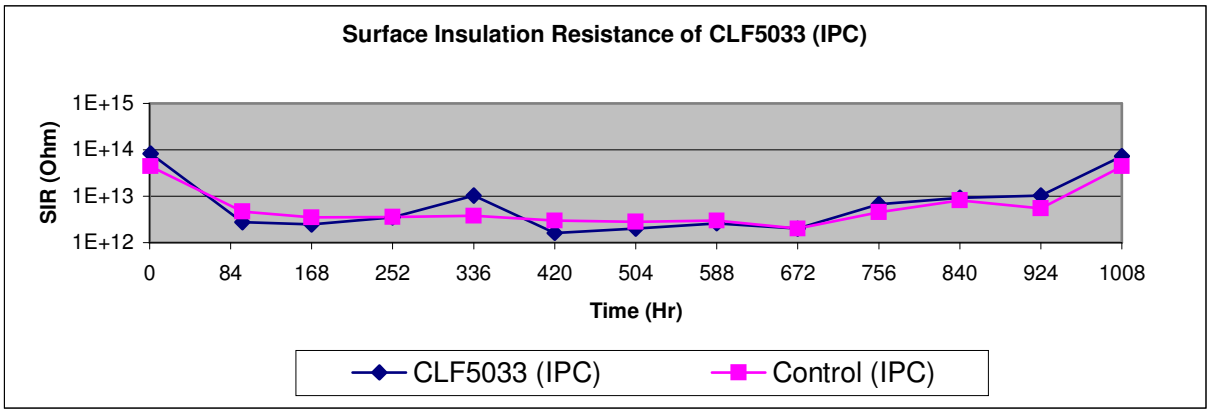
## SURFACE INSULATION RESISTANCE

It determines the surface insulation properties of the flux on the finished product. Thus, it determines the reliability of the residue if left on board without cleaning.

### Test Conditions (IPC-TM-650 2.6.3.3)

| | | |
|---|---|---|
| Humidity | : | 85 %RH |
| Temperature | : | 85°C |
| Duration | : | 1000hrs |
| Bias Voltage | : | +50V D.C. |
| Applied Voltage | : | -100V D.C. |
| Test Coupon | : | IPC-B-24 |

### Result:

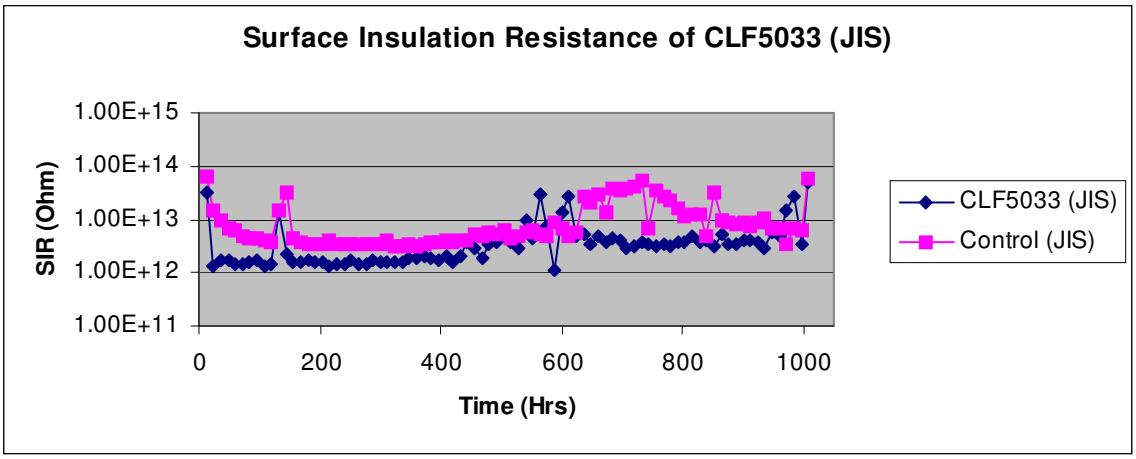



Surface Insulation Resistance: $> 1.0 \times 10^{12}\ \Omega$, passed.

### Test Conditions

| | | |
|---|---|---|
| Humidity | : | 85 %RH |
| Temperature | : | 85°C |
| Duration | : | 1000hrs |
| Bias Voltage | : | +50V D.C. |
| Applied Voltage | : | -100V D.C. |
| Test Coupon | : | JIS C 6480 |

**Result:**




Surface Insulation Resistance: $> 1.0 \times 10^{12}\ \Omega$, passed.

## COPPER CORROSION TEST

Evaluate the existence of corrosion due to the flux residue after soldering under moisture.

**Method:**

- Weigh 1 gram of solder and make into a coil with a 3mm mandrel.
- Place the cleaned copper coupon on the surface of solder bath set to 250°C.
- Let the specimen remain on the solder bath surface for 5 secs after solder fusing.
- Allow the specimen to cool for 15mins.
- Place the specimen in a humidifier set at 40°C, 90 %RH for 96hrs.
- Inspect the specimen for growth of corrosive compounds that are assumed to be green, bluish green or white.
- Place one drop of test flux onto the copper mirror.

**Result:**
No drastic change in appearance of copper under the residue or at the flux boundary. CLF5033 has passed the corrosion test.

## COPPER MIRROR TEST

This test provides a visual check on the corrosive effect of the flux on the substrate.

**Method:**

- Place one drop of test flux onto the copper mirror.
- Keep copper mirror at 23 $\pm$ 2$^{o}$C & 50 $\pm$ 5% RH for 24 hrs.
- Remove test flux by immersion in clean 2-propanol.

**Result:**
The results showed that CLF5033 is classified as “M”.

## SPREAD TEST

The purpose of this test is to measure the spread capability of the CLF5033 core flux.

**Method:**

- Maintain hot plate temperature at 250°C.
- Place the solder wire (∅3mm) on a copper coupon.
- Place the coupon on hot plate.
- Measure rate of spread with the formula below:

Rate of Spread = (D-H)/D x 100%
where D = 1.24 x $V^{1/3}$
V = Mass / Specific Gravity
H = Height of Spread Solder

**Result:**
The result showed that CLF5033 had a spread factor of 80% with SnCu0.7 solder.

## RESIDUE DRYNESS TEST

This test determines the tackiness of the residue after soldering.

**Method:**

- Place circular solid solder wire preform on Copper.
- Add 0.035 to 0.040g of solid portion of flux to center of wire preform.
- Set solder bath temperature at 50 +/2 $^{o}$C above the alloy's liquidus temperature.
- After fusing of solder, leave it for 5 secs.
- Take the test piece out of the bath and cool it for 30 mins.
- Sprinkle powder talc onto the flux residue on the test piece.
- Brush the surface of the residue in the same direction twice and inspect test piece.

**Result:**

Powder falls off test piece easily. The flux residue has passed the dryness test.

**DISCLAIMER OF LIABILITY**

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