

Cautions on Using Tip

HAKKO CORPORATION

(1) Selecting the tip shape

The tip transmits the heat supplied to the heating element to a soldered zone. Accordingly, the work time can be reduced when the selected tip makes as wide as possible the contact area with the soldered zone.

(2) Setting the temperature of the tip

The temperature most suitable to soldering is regarded as the melting point (183°C in eutectic solder consisting of 60% tin and 40% lead) plus about 50°C. The most suitable tip temperature is add 100 °C more to it. Determine the tip temperature under consideration of the solder constituents, soldered zone and soldering iron size (W value).

(3) Wettability of the tip

The end of the tip is plated with tin and lead to keep the wettability for solder. If the tin-lead-plated end becomes black or red with rust, soldering may be disabled. The tin-lead plated end becomes black or red when the solder used for tin-lead plating is removed, the iron plating (undercoat) is exposed, and oxide film (such as rust) is generated. For preventing this phenomenon and making the tip usable again, put solder on the end of the tip in accordance with “(5) Maintenance of the tip”.

(4) Life of the tip

In the tip, iron which is not erode easily is plated on copper having good heat conduction, tin and lead are plated on the soldering area, and chromium is plated on other areas to prevent wetting of solder.

The life of the tip may be shorter by the following causes:

- [1] The iron-plated area is eroded by solder, and holes are made.
- [2] The tin-lead-plated area becomes black due to oxidation, and solder does not become wet on the tip.
- [3] The surface of the heating element insertion area is oxidized, and heat conduction is deteriorated.
- [4] In the case of flow soldering, the tip is mechanically consumed by contact with patterns, leads, etc.
- [5] The tip surface is oxidized, and the earth resistance becomes high.

Erosion of iron plating described in [1] occurs when iron used for plating and tin contained in solder become alloy, and the alloy is melted into solder. This phenomenon occurs more easily when lead-free solder is used or when the tip temperature is higher, and occurs often especially when the tip temperature exceeds 400°C. Figure 1 shows the experimental result regarding the tip temperature and erosion quantity.

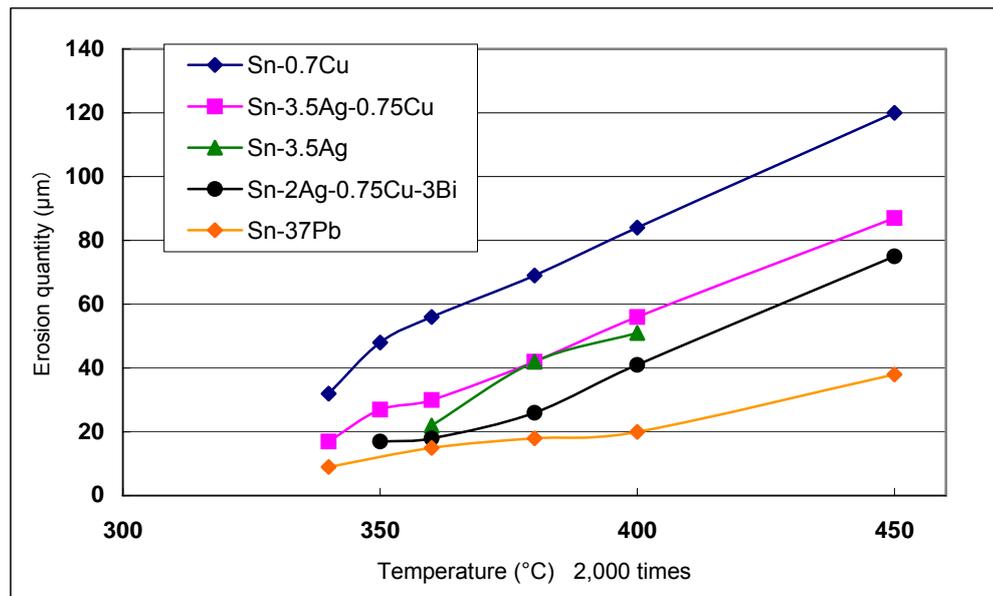


Fig. 1 Tip erosion quantity depending on solder type and tip temperature
($\phi 1 \text{ mm} \times 5 \text{ mm}$, 2,000 times)

Accordingly, it is important for extending the life of the tip to select such a soldering iron having good heat recovery characteristics whose tip temperature can be set as low as possible.

The phenomenon [2] occurs when the iron-plated area under tin-lead plating is exposed and oxidized. This phenomenon occurs easily especially when lead-free solder is used or when solder is not supplied in a bridge repair process, etc.

The phenomenon [3] occurs after long-time use. When the heating element insertion area is oxidized and oxide is generated from the inside, heat conduction is deteriorated and the surface is expanded. As a result, the life of the tip becomes shorter.

(5) Maintenance of the tip

5-1 During the work

Wipe old solder adhered on the tip with cleaner before starting the work.

When using cleaning sponge, make sure to soak the sponge into water, and then squeeze it tightly.

When suspending the work, feed new solder to the tip, and then put the soldering iron on the dedicated soldering iron holder while solder remains on the tip.

5-2 When the work is finished

When finishing the work, feed new solder to the tip.

5-3 When the tip is black and solder does not fit well

When the tip becomes black or when red rust is generated on the tip, the tip does not accept solder and does not allow soldering. If the oxide film cannot be removed with cleaning sponge and so on, wipe the tip with paste containing tin such as the FS-100 to remove the oxide and recover the wettability. If the oxide cannot be removed with the FS-100, use a device such as the FT-700 which removes oxide with a rotating brush, and then wipe the tip with FS-100 to recover the wettability.

As described above, the life of the tip can be extended with proper maintenance and low tip temperature.

Established on March 22, 2000

Revised on Apr. 22, 2005

Revised on Sept. 5, 2007