

Ormecon[®] Chemical Tin An alternative to HAL (Hot Air Leveling)

The ever-increasing density required by SMD pins calls for very flat pad surfaces. The HAL procedure does not always fully meet these requirements. With the HAL process the printed circuit board is immersed vertically into liquid tin and this is then blown off with hot air. Thus puddles and droplets are prone to develop on the pad surfaces.

Beta LAYOUT is now pleased to offer chemical tin as a lead-free alternative soldering surface to HAL.

As with HAL, the tinning is partial and has nothing to do with the lead-tin remelting procedure used in former times.

The assembly of high pin-count SMD elements is substantially simplified by the flat surface, making Chemical Tin PCBs best suited for so-called fine-pitch applications.

Unlike the HAL process, the PCB is not subjected to any temperature stresses and this leads to far less warping and twisting.

The chemical tin finish can be soldered several times problem-free and exhibits further outstanding insertion characteristics.

The soldering parameters are approximately the same as with HAL surfaces.

While generally not a critical factor in prototypes, it is nevertheless important to note:

The solder-ability period of PCBs with chemical tin finish is approx. 6-12 months

This is due to the following:

Between the copper pads and the tin coating is a so-called intermetallic phase.

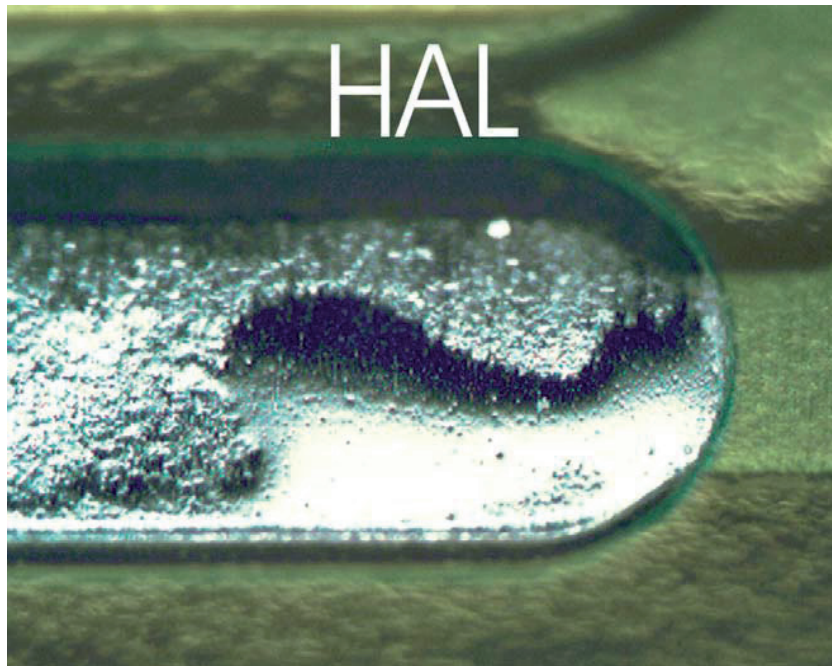
In the case of delivery this is approx. 0.25 µm thick. During the storage the diffusion of the copper continues into the tin surface, so that the thickness of the pure copper and/or tin layer decreases. If this alloy reaches the surface it becomes encrusted with an indelible oxide coating making soldering impossible. Therefore the shelf-life of chemically tin PCBs is somewhat shorter than those with HAL finishes.

Characteristics of chemical tin:

Tin layer:	Homogeneous coating of the exposed Cu surfaces
Tin layer thickness:	0.8 - 1.2 µm, examination on test board by means of coulometric measurement (GCM)
Soldering parameter:	similar to HAL or chem. Ni/Gold
Soldering technique:	all well-known techniques are possible
Soldering ability:	2-3 times
Insertion Technology:	Yes
Bondable:	No
Shelf-life:	At least 12 months with appropriate storage.
Storage conditions:	Temperature 5 °C - 35 °C, Humidity 30 % - 70 %, corrosive atmospheres like galvanic or sulfur dioxide environments are to be avoided
Total copper erosion:	Total copper erosion < 4 µm. Gravimetric examination of test printed circuit board

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A comparison



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