SN100CL Series
Nihon Superior Lead Free Solder Bar

DESCRIPTION

Florida CirTech, in a licensing agreement with Nihon Superior, is offering a patented lead free nickel stabilized tin/copper Hot Air Leveling (HAL) alloy. The starting alloy is known as the SN100CL and the replenishment alloy is known as SN100CLe.

The SN100CL nominal composition is 99.3% Tin, 0.6% Copper and a balance of Nickel & other proprietary elements.

The SN100CLe is similar to the SN100CL without the copper. This is used for replenishment.

The patented addition of nickel to the tin-copper eutectic offers the following advantages:

- **Superior fluidity. Surface Mount Pads are very uniform and flat.**
- **Capable of handling very fine pitch due to very good solder fluidity**
- **Good shelf life**
- **Minimal attack on copper (PCB)**
- **Minimal attack on stainless steel (solder pots)**
- **Easy to manage in the solder pot**
- **Lower cost than silver containing lead free alloys**
- **Lower drossing than other lead free alloys**
- **Minimal increase in operating temperature (est. 485-515F).**
- **Compatible with both 63/37 and lead free final assembly**
- **Eutectic solder. Excellent cosmetics..**

COMPARISON CHART OF LEAD FREE ALLOYS

Characteristic	SN100CL	63/37 solder	Tin/3Ag/0.5Cu (SAC305)
Smooth, Shiny Joint	Yes	Yes	No
Reactive to equipment	No	No	Yes
Low Pot Temperature	Yes	Yes	No
Easy Pot Management	Yes	Yes	No
Low Cost	Yes	Yes	No
Low Drossing	Yes	Yes	No

APPLICATION

The SN100CL and SN100CLe lead free alloys can be used in both vertical and horizontal HAL machines. Please consult with Florida CirTech with regards to our recommended flux and oil (horizontal) for a particular system. FCT is a leading manufacturer of hot air fluxes and oils.

As the SN100CL solder bath is used, copper dissolves into the solder from the bare board. If the copper content of the solder bath exceeds 0.90%, there is likely to be an increase in the incidence of bridges and overall graininess. In order to maintain the proper copper level in the bath, Florida Cirtech offers the Nihon Superior SN100CLe as the top-up alloy. The recommended operating window for copper is between 0.70 and 1.10%. Verification of copper content is easy with the Solder Pot Analysis Program offered by Florida Cirtech.

Copper levels can be reduced by "drossing". In contrast to drossing for 63/37 solder bar, the drossing procedure for the SN100CL system is different in that the copper typically settles at the bottom. Please consult with Florida CirTech on the details of this.

A minimum air knife temperature of 535F is recommended for all boards. Please consult with a FCT salesperson regarding details such as dwell times etc.

TECHNICAL SPECIFICATIONS

Element	SN100CL Fresh	SN100Cle Fresh	Solder Pot
Sn	Balance	Balance	Balance
Cu	0.60-0.70	0.10 max	0.70-1.10*
Ni	0.04	0.07	0.04-0.08
Pb	0.05 max	0.05 max	0.10 max*
Ag	0.05 max	0.05 max	0.05 max
Al	0.002 max	0.002 max	0.002 max
As	0.03 max	0.03 max	0.03 max
Au	0.05 max	0.05 max	0.05 max
Bi	0.03 max	0.03 max	0.05 max
Cd	0.002 max	0.002 max	0.01 max
Fe	0.02 max	0.02 max	0.02 max
Sb	0.05 max	0.05 max	0.05 max
Zn	0.002 max	0.002 max	0.01 max

The ROHS limit on lead for a PWB to be considered lead free is 0.1%.
The copper eutectic point is 0.90%

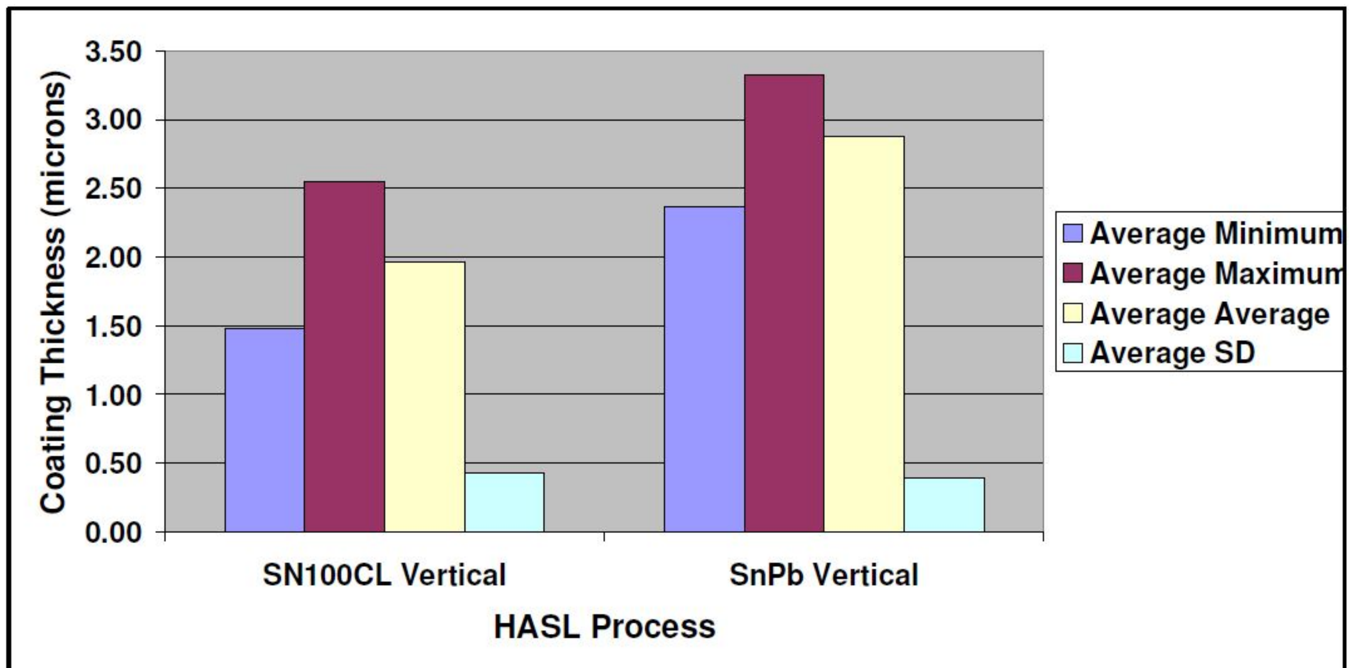
As copper content increases through use of the SN100CL alloy, the melting point (m.p.) also increases. SN100CL with 0.90% copper has a m.p. of 440 F. SN100CL with a copper content of 1.00% has a m.p. of 445 F. Each 0.1% increase in copper content causes a melting point increase of roughly 5 deg. F. This effectively increases the operating temperature of the alloy. Higher copper concentrations increase the possibility of dull or grainy solder.

Drossing can be used to remove some of the copper as a copper – nickel mixture. The copper eutectic point is 0.90%, so the copper content cannot be reduced below this by normal drossing. The replenishment alloy SN100CLe is then used to reduce the copper content below 0.90% through dilution.

Nickel content also affects the fluidity and wetting ability of the SN100CL solder. Nickel concentrations below 0.04% will cause the fluidity to decrease, and the solder could be dull and grainy in appearance. Wetting will worsen, especially on solder mask defined pads. It is important to maintain both the copper and nickel within recommended parameters for optimal wetting and good appearance.

Drossing removes nickel along with copper. Nickel also is deposited on the PWB boards at the solder - copper interface, essentially becoming part of the intermetallic. It is necessary to periodically replenish nickel in the solder pot. This is done through additions of SN100CLe, and when large adds are required Ni10 Additive is used.

THICKNESS DATA FOR SN100CL VERSUS SN 73/PB 37 SOLDER



The overall thickness of the SN100CL solder is typically lower than Sn/Pb solder. The SN100CL solder deposit is usually more planar than Sn/Pb with less of a tendency to form thick "bumps" of solder.

PACKAGING

SN100CL and SN100CLe are packaged in 50 pound boxes and each bar weighs approximately two pounds. Nickel 10 Additive is packaged in 2 pound jars.

HEALTH AND SAFETY

Refer to the MSDS for guidance on safety and health issues.