

PRODUCT PROFILE

ELECTROLOY LEAD FREE BAR

Product Name

Product Code

SOLDER BAR – LEAD FREE ALLOY – Sn99.3/Cu0.7+Ni

LF- 801B

**– LEAD FREE ALLOY – Sn99.6/Cu0.4+Ni
(TOP UP ALLOY)**

LF- 801BE

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DOC CATEGORY: 3

PF – LF-801B – 20062011 – REV.C – Page 1 of 6



. China . Malaysia . Singapore

Solder Connections

PRODUCT INFORMATION

Electroloy has entered into an agreement with Nihon Superior to be able to offer the patented lead free nickel stabilized tin/copper wave solder alloy under Electroloy Product Number LF-801B in South East Asia and China.

The corresponding patented countries & patent numbers : Malaysia : MY-114845A
Thailand : 16212
Indonesia : ID 0010052
China : ZL 99800339.5

LF-801B was developed to offer a technically superior and more economical option to other lead free alloys. This nickel stabilized tin/copper alloy gives bridge-free wave soldering at temperatures normally used with tin/lead alloys.

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

- Low cost lead free alloy
- Low dross formation
- Bright, smooth solder joints that is free from gross micro cracks.
- Good through hole penetration.
- Low rate of copper leaching
- Less aggressive on stainless steel & other solder pot materials
- Close to eutectic temperature
- Easy to maintain alloy composition

CHEMICAL COMPOSITION OF ALLOY

The composition of Electroloy's LF-801B & LF-801BE lead free bar is strictly controlled to the following specification: -

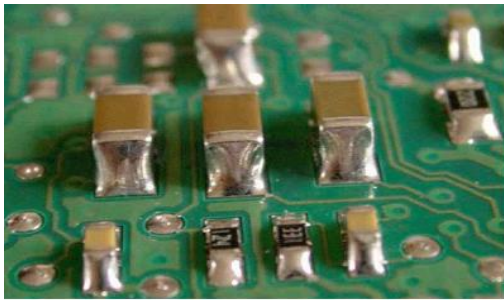
<u>ELEMENT</u>	<u>LF-801 SPECIFICATION</u>	<u>LF-801BE SPECIFICATION (TOP UP ALLOY)</u>	<u>J-STD-006B Amendment 1</u>
TIN	REMAINDER	REMAINDER	REMAINDER
LEAD	MAX.0.050 %	MAX.0.050 %	MAX.0.070 %
ALUMINIUM	MAX 0.002 %	MAX 0.002 %	MAX.0.005 %
ANTIMONY	MAX 0.050 %	MAX 0.050 %	MAX.0.200 %
ARSENIC	MAX 0.030 %	MAX 0.030 %	MAX.0.030 %
BISMUTH	MAX 0.030 %	MAX 0.030 %	MAX.0.100 %
COPPER	0.5 – 0.7 %	MAX 0.4 %	-
IRON	MAX 0.020 %	MAX 0.020 %	MAX.0.020 %
ZINC	MAX 0.002 %	MAX 0.002 %	MAX.0.003 %
CADMIUM	MAX 0.002 %	MAX 0.002 %	MAX.0.002 %
SILVER	MAX 0.050 %	MAX 0.050 %	MAX.0.100 %
NICKEL	MAX 0.100 %	MAX 0.100 %	-
INDIUM	MAX 0.100 %	MAX 0.100 %	MAX.0.100 %
GOLD	MAX 0.050 %	MAX 0.050 %	MAX.0.050 %

COMPARISON BETWEEN LF- 801B and Sn63/Pb37

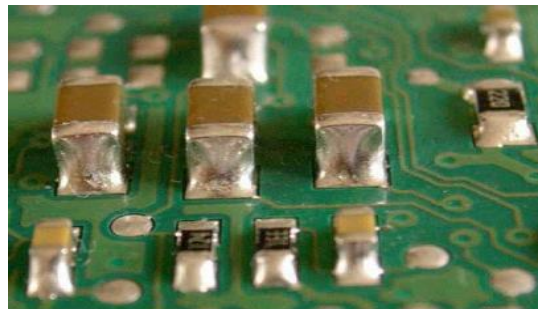
Comparison of LF-801B with Sn63/Pb37 on mechanical characteristics

Characteristics	LF-801B	Sn63/Pb37	Comparison
Alloy composition	Sn99.3/Cu0.7+Ni	Sn63/Pb37	
Specific gravity	7.4	8.4	12% less solder required for same volume of solder joints
Melting temperature °C	227	183	24% more heat required to melt
Tensile strength (MPa)	33	42	21% less mechanical strength
Thermal Conductivity (J/m.s.K°)	64	50	28% better thermal conductivity
Electrical Resistivity (μΩ-cm)	13	14.5	11% better electrical conductivity

Comparison of LF-801B with Sn63/Pb37 solder joints



Sn63/Pb37



LF- 801B

COMPARISON CHART OF LEAD FREE STANDARD ALLOYS

Characteristics	LF-801B	SN/0.7CU	SAC405	SAC305	SN/0.7CU / 0.5AG
Smooth, Shiny joint	YES	NO	NO	NO	NO
Reactive to equipment	NO	NO	YES	YES	NO
Easy pot management	YES	NO	NO	NO	NO
Low cost	YES	YES	NO	NO	YES
Low dross	YES	NO	NO	NO	NO

PRODUCT APPLICATION

LF-801B lead free solder has proven to perform well in automated wave soldering, selective soldering, and static solder pots.

In the LF-801B solder bath, copper tends to dissolve into the solder from the boards and component leads. If the copper content of the solder bath exceeds 0.85%, it is likely to cause an increase in the incidence of bridges, icicles, and other defects.

In order to maintain the copper level within the permissible limit in the solder bath, Electroloy recommends the LF-801BE top-up alloy. The LF-801BE has a lower copper content than the LF-801B to ensure that the copper content in the solder pot stays below the critical level of 0.85%.

Verification of copper content is easy with the free Solder Pot Analysis offered by Electroloy. The statistical analysis of your LF-801B solder pot will help you monitor the copper level over time & make critical decision to achieve good production yield with our LF-801B bars.

- **Wave soldering**

Recommended Operating Parameters

One of the major difference between LF-801B and standard Sn63/Pb37 is the processing temperature and the melting point of the alloys. The difference between these two temperatures are narrow, hence care must be taken to ensure the process settings are optimized.

- Control air drafts in machine.
- Close off openings.
- Minimize gap between pre-heaters and pot.
- Adjust damper to reduce drafts.
- Ensure cooling fans blow away from pot.

- Ensure adequate preheat for board type & temperature in the wave meets requirement listed below :

P.C. Board Type	Recommended Preheat Temperature Range (°C)	Recommended Solder Wave Temperature Range (°C)
Single-sided, Simple double-sided	90 - 100	245 - 250
Double-sided	100 - 115	250 - 255
Heavy double-sided, multi-layer	120 - 130	255 - 260

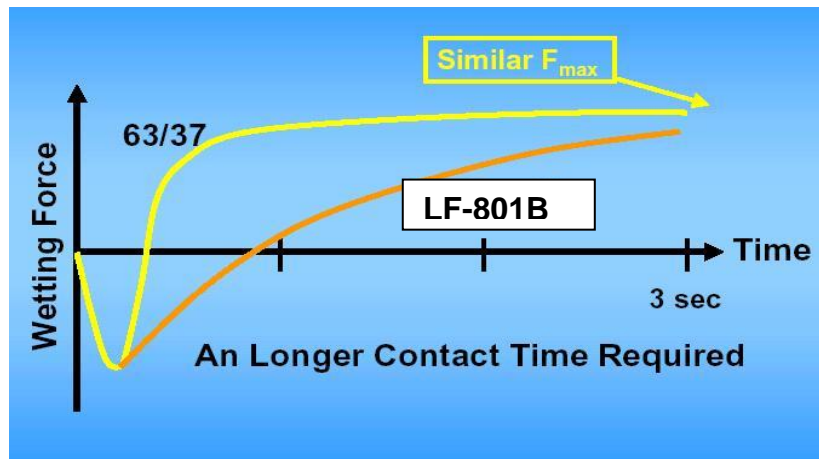
- Use fluxes that can withstand the preheat requirements, such as Electroloy's EM3155R-L No Clean Flux.

Recommended Process Parameter Setting

The key point in running lead free soldering is to acknowledge that the process window is smaller than the Sn63/ Pb37 solder. Therefore careful control of process parameter is necessary to achieve a good lead free solder joint.

Key Parameter : 1) Longer Contact Time 2) Slower Conveyor Speed

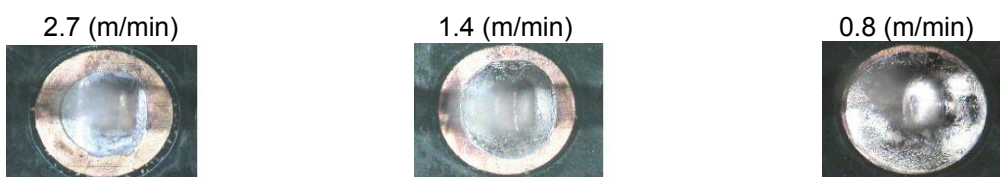
Recommended Process Setting	
PROCESS PARAMETERS	LF-801B
Conveyer Speed	1.0m – 0.7m/min.
Contact Time	3.0s – 4.0s



Longer contact time to achieve the desired result similar to Sn 63/37

Effect of conveyer speed / contact time on Topside Fillet Formation.

The 0.8m/min conveyer speed & longer contact time produced a better result



Conveyor Speed (m/min)

• **Dip Soldering**

The LF-801B bars are also suitable to be used in high temperature dip thinning of fine copper wire in component Manufacturing.

PHYSICAL APPEARANCE

Electroloy's LF-801B lead free bars come in triangle casted & extruded types. The LF-801B exhibit a shiny appearance & uniform silver-grey in color. The brand & alloy code is embossed onto the surface of each bar. Each bar is approximately 700 – 900 grams in weight. The physical dimension is 330mm x equal side of 24mm.



PACKAGING

The LF-801B lead free bars are pack into “Green “carton boxes of 20kg each. Each box contain the following traceable information:

1. The Supplier
2. Grade
3. Product Code / Type
4. Lot Number
5. Weight per Box

DELIVERY

Each shipment shall be accompanied with a Certificate of Analysis for each lot, which indicates the impurity level of each element according to LF-801 Specification.

STORAGE AND SHELF LIFE

Electroloy's LF-801B lead free bars have no limited shelf life when handled properly. Storage must be in a dry & non-corrosive environment.

To minimize the bars from further oxidation, ensure that the packaging is not damaged.

The solder surface may lose its shine & appear a dull shade of light yellow. This is a surface phenomenon & is not detrimental to product functionality & performance.

HEALTH AND SAFETY

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

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PF – LF-801B – 20062011 – REV.C – Page 6 of 6