

Ultrasure® K100LD

Lead-free Bar Solder Alloy

Patent Pending

Product Description

Pressure from marketing and legislation in both Europe and Asia have forced electronics manufacturers to move away from lead-based solders. Typical lead-free alloys contain 3-4% silver, which can be costly.

In addition to cost concerns, typical Tin/Silver/Copper (or SAC) alloys also present issues with increased dissolution of Copper from boards and components during the soldering process. As an example, SAC305, one of the industry's most popular lead-free wave soldering alloys, is known to dissolve Copper at a rate more than twice as fast as Sn63Pb37.

In response to demand for a low cost and low copper dissolution alloy, Kester has developed **Ultrasure® K100LD**. Kester K100LD is a eutectic Tin/Copper alloy with controlled metallic dopants to control the grain structure within the solder joint, and to minimize the dissolution of copper into the solder pot. K100LD virtually eliminates the occurrence of common defects such as icicling and bridging. The improved grain structure also results in shinier solder joints than traditional lead-free alloy alternatives.

The accelerated rate of Copper dissolution has caused difficulties for electronic assemblers due to Copper terminal erosion and also elevated Copper levels in wave soldering pots. In particular, the elevated Copper levels in wave soldering pots can make the alloy flow more sluggishly, creating additional defects if the solder pot is not carefully controlled.

Alloy	Relative Rate
K100LD	0.8
Sn63	1.0
Competitor A (SnCuNi)	1.0
Competitor B (SAC + Bi)	1.6
SAC305	2.1
SnCu	2.2
Sn96.5Ag3.5	2.3
Pure Tin	2.4

Kester K100LD compares favorably to other low-cost, lead-free alloys of tin and copper in terms of wetting and flow characteristics.

- Low cost, lead-free alloy
- Bright, smooth solder joints with no visible shrinkage effects
- Excellent through-hole penetration and topside fillet
- Low dissolution of copper from boards and components into solder pot
- Eutectic alloy
- 20% Lower dross rate than Sn63Pb37 in laboratory tests
- Less corrosive to solder pots than SAC305

Pot Maintenance

Kester's Solder Analysis Program (Option C) should be utilized periodically to verify composition and purity. If the concentration of Copper increases beyond 0.85%, it is recommended to top-off the solder pot with K100LDA. K100LDA contains a lower copper concentration (0.2%) than K100LD and will help stabilize the level of Copper at the nominal concentration (0.7%).

Process Information

Suitable for wave, selective and dip tinning operations. Use Kester fluxes 979, 959T, 2220-VF, 2235 for optimum wave soldering. Pot temperatures range for wave and dip tinning is 260-270°C.

Maximum Allowed Impurities

Kester uses the highest purity virgin metals to make Kester K100LD. Kester K100LD substantially exceeds the requirements of current industry standards for allowable impurity requirements. Kester K100LD meets or exceeds the requirements of J-STD-006 and ASTM B32.

Element	J-STD-006	K100LD (Sn Cu0.7)
Gold	0.050	0.002
Antimony	0.050	0.050
Cadmium	0.002	0.001
Zinc	0.003	0.001
Aluminum	0.005	0.002
Iron	0.020	0.010
Arsenic	0.030	0.020
Bismuth	0.100	0.100
Silver	0.100	0.100
Indium	0.100	0.007
Lead	0.100	0.050

Physical Properties

Melting Temperature	~227°C (441°F)
Tensile Strength	32 MPa (4600 psi)
Thermal Conductivity	64 W/m-K
Electrical Resistivity	13 $\mu\Omega$ -cm

Storage and Shelf Life

Kester K100LD solder has no limited shelf life when handled properly. Storage must be in a dry, non-corrosive environment. The solder surface may lose its shine and appear a dull shade of gray. This is a surface phenomenon and is not detrimental to product functionality.

Health & Safety

This product, during handling or use, may be hazardous to health or the environment. Read the Material Safety Data Sheet and warning label before using this product.

World Headquarters: 800 West Thorndale Avenue, Itasca, Illinois, 60143 USA
Phone: (+1) 847-297-1600 • **Email:** customerservice@kester.com • **Website:** www.kester.com

Asia Pacific Headquarters
 500 Chai Chee Lane
 Singapore 469024
 (+65) 6449-1133
 customerservice@kester.com.sg

European Headquarters
 Zum Plom 5
 08541 Neuensalz
 Germany
 (+49) 3741 4233-0
 customerservice@kester-eu.com

Japanese Headquarters
 20-11 Yokokawa 2-Chome
 Sumida-Ku
 Tokyo 130-0003 Japan
 (+81) 3-3624-5351
 jpsales@kester.com.sg

The data recommendations presented are based on tests, which we consider reliable. Because Kester has no control over the conditions of use, we disclaim any responsibility connected with the use of any of our products or the information presented. We advise that all chemical products be used only by or under the direction of technically qualified personnel who are aware of the potential hazards involved and the necessity for reasonable care in their handling. The technical information contained herein is consistent with the properties of this material but should not be used in the preparation of specifications as it is intended for reference only. For assistance in preparing specifications, please contact your local Kester office for details.