

# Ultrapure K100LD Lead-free Solder Alloy

## 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 Ultrapure K100LD. 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

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 100% tin.

## 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

Ultrasure meets the requirements of current industry standards for allowable impurity requirements.

Element	J-STD-006C	K100LD
Gold	0.050	0.050
Antimony	0.200	0.200
Cadmium	0.002	0.002
Zinc	0.003	0.003
Aluminum	0.005	0.005
Iron	0.020	0.020
Arsenic	0.030	0.030
Silver	0.100	0.100
Indium	0.100	0.100
Lead	0.050	0.050

Ultrasure will conform to these requirements when purchased directly or through stocking distributors. Kester is the only manufacturer of Ultrasure quality solder. Ultrasure conforms to the requirements of J-STD-006C formerly QQ-S-571F. DOD-STD-2000-1A (Soldering Technology, High Quality/High Reliability) states that it is the responsibility of the manufacturer to select those materials and processes that will produce acceptable high quality/high reliability products.

## Physical Properties

<b>Melting Temperature</b>	~227°C (441°F)
<b>Tensile Strength</b>	3 2 MPa (4600 psi)
<b>Thermal Conductivity</b>	64 W/m-K
<b>Electrical Resistivity</b>	13 $\mu\Omega$ -cm

## Storage, Handling and Shelf Life

Kester bar solder has an indefinite shelf life when stored in a dry, non-corrosive environment. The 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 and Safety

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