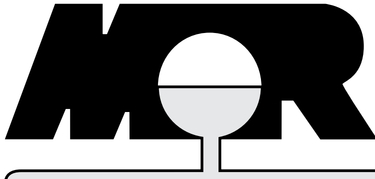


SC995e™ Lead Free Electrolytic Wave Solder Product Bulletin

Purity Improves Process

Metallic Resources' special SC995e lead free bar solder is manufactured from electrolytically processed tin, copper, and cobalt to create solder so pure it far exceeds the most common specification requirements. The lead-free solder alloy is Sn99.5/Cu0.5/Co. **It is RoHS compliant.** The melt point is 228°C approx. and the recommended operating temperatures are between 260-275°C. Standard packaging includes 25 and 50 pound boxes containing cast bars. Metallic Resources also offers ingots and feeder bars.

When copper content approaches 1.0%, Metallic Resources offers a replenishment alloy, SC995e-R to lower the copper content of the solder bath.

Versatile Uses

Metallic Resources high purity LF electrolytic solder is specially designed for use in all wave soldering and tin and dip soldering applications. It is primarily used in printed circuit board assembly operations common to the electronics market.

Less Dross and Re-Work

This alloy provides brighter, shinier, less grainy solder joints when compared to Sn96.5/Ag3.0/Cu0.5 (SAC 305) alloy. It is much less expensive. Less solder is consumed compared to tin lead solder because the weight per cubic inch of the solder is lower. The lower viscosity improves the fluidity, which in turn improves the LF solder's wetting capability and reduces necessary re-work including bridging, icicling, cobwebbing and flagging. High purity LF electrolytic solder is environmentally friendly, and generates less dross compared to all other "virgin grade" LF solders. Less dross generation results in more soldered

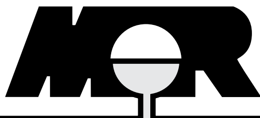
joints per pound of solder and greater cost-effectiveness through less waste. Generated dross has less solder content for minimal solder loss, more efficient product usage, and greater economy. Solder pots using electrolytic solder provide energy savings, extended pot life, reduced thermal stress, and reduced potential of contamination.

The electrolytic manufacturing process assures batch-to-batch consistency for predictable solder performance in the solder pot. The process removes metallic and non-metallic impurities often found in "virgin metals" to provide a purer solder. This purity results in a smaller crystalline structure which exhibits a shinier, more brilliant solder appearance.

Metallic Resources' SC995e does not contain any rare earth or grain refiner (such as Nickel) ingredients which deplete and need to be added back in to the alloy at great expense. Fewer process problems thus occur due to the stable nature of SC995e compared to other lead free alloys.

Certified

Metallic Resources' SC995e bar solder exceeds the rigid requirements of Specification J-STD-006. Certificates of Conformance and Analysis are automatically provided with each shipment.



METALLIC RESOURCES, INC.

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Independent Testing

Thermal Shock
-10 to +100°C >1000 cycles

Temperature/Humidity
85°C/85% RH with Bias > 500 hrs.
No Tin Whiskers observed

Density
7.4g/cm3

Tension Testing
Tensile Strength = 28 MPa
Yield Strength = 21 MPa
Elongation-at-break = 27%

Wetting Balance Test
Max. Wetting Force = 0.31 mN/mm at 265°C
Time to Max. Wetting Force = 0.25 seconds

Specific Heat Capacity
Specific Heat Capacity = 295 J/kg . K

Thermal Conductivity and Thermal Diffusivity Tests
Thermal Conductivity = 81.75 W/m.K at 25°C
Thermal Diffusivity = 3.817×10^{-5} m^2/s at 25°C

Coefficient of Thermal Expansion
Coefficient of thermal expansion, a, = 3.47×10^{-3} mm/mm°C in range of 25-200°C

Electric Resistivity
Electrical Resistivity = 0.123 mW-m at 25°C

Alloy SC995e (Sn99.5/Cu0.5/Co)

	J-STD-006B	MRI Specs	MRI Typical Analysis
Sn	99.5000 (±0.5)	99.3-99.7	99.6000
As	0.0300	0.0035 (max)	0.0015
Sb	0.2000	0.0250 (max)	0.0150
Au	0.0500	0.0002 (max)	0.0002
Fe	0.0200	0.0050 (max)	0.0030
Ni	0.0100	0.0060 (max)	0.0030
Bi	0.1000	0.0100 (max)	0.0040
Al	0.0050	0.0010 (max)	0.0001
Cu	0.5000 (±0.1)	0.5000 (±0.1)	0.5000
Ag	0.1000	0.0010 (max)	0.0001
Zn	0.0030	0.0010 (max)	0.0005
Cd	0.0020	0.0010 (max)	0.0005
In	0.1000	0.0100 (max)	0.0050
Pb	0.1000	0.0500 (max)	0.0250
Co	N/A	<0.1000	<0.1000

Copper Loading Capacity of Solder

Sn63/Pb37 alloy

Temp:	°F	440	480	500	520	-----
	°C	226	248	260	271	-----
Cu conc. (wt.%) at beginning of level off (saturation) point		0.21	0.4	0.44	0.46	-----
Cu dissolution rate as % increase of Cu in solder pot		0.001	0.002	0.0022	0.0023	-----

99.5Sn/Cu0.5/Co lead-free alloy

Temp:	°F	490	500	510	520	530
	°C	254	260	265	271	276
Cu conc. (wt.%) at beginning of level off (saturation) point		0.7	0.8	0.824	0.887	1.01
Cu dissolution rate as % increase of Cu in solder pot		0.0014	0.0017	0.002	0.0021	0.0037

SnCuCo-0911

Recommendations made by this company and its representatives are based upon test data, experiments, and experience believed to be reliable. No guarantee of accuracy is made, however. All products are sold upon the condition that the buyer will make his own tests and assume the responsibility for the suitability of the product under his application and service conditions. Statements made herein will vary according to the nature of the surfaces to which the product is applied, application technique, and service condition. We in no event assume liability beyound the purchase price of our products involved and make as a condition of sale that we will refund the purchase price or replace materials proven to be defective and reported in a timely fashion, but no later than six (6) months after shipment. No representative of the manufacturer and/or seller has the authority to alter or extend these conditions.