



15 Mercedes Drive  
Montvale, NJ 07645 U.S.A.  
Telephone: 201.791.4020  
Fax: 201.791.1637  
[www.coininginc.com](http://www.coininginc.com)



ELECTRONIC COMPONENTS  
AND PACKAGING

## Data Sheet: 99.3 Tin –.7 Copper

### Physical Property Information of bulk solder:

Solder Alloy Composition	99.3%Sn-.7%Cu (weight per cent)
Melting point	227°C
Density	7.26 Mg.m <sup>-3</sup>
Coefficient of Thermal Expansion (CTE)	21 ppm/K
Thermal Conductivity	70 W m <sup>-1</sup> .K <sup>-1</sup>
Electrical Resistivity	13.5 μΩ.cm
Hardness	9.0 HB

### Mechanical Properties:

<b>Fatigue Strength at 20°C:</b>	12 Nm <sup>-2</sup> (>5000 cycles), 20 Nm <sup>-2</sup> (>50 cycles),
<b>at 100°C</b>	8 Nm <sup>-2</sup> (>1500 cycles), 10 Nm <sup>-2</sup> (>20 cycles)
<b>Yield stress at 20°C:</b>	6 Nm <sup>-2</sup>
<b>at 100°C</b>	10 Nm <sup>-2</sup>

Typical impurity levels for electronic grade are less than:

Pb: 0.05,	Ni: 0.01,	Al: 0.005,	Bi: 0.10,	Fe: 0.02,
Zn: 0.003,	As: 0.03,	Cd: 0.002	In: 0.05	

**Application:** Soldering temperature for reflow should be minimal at or above 250°C for 20 seconds. This assumes either very clean, soldering surfaces or the presence of a reducing agent or atmosphere during the soldering cycle. If and when the components are slightly oxidized, a combination with flux and higher temperatures and/or longer soldering temperatures is required. Alternatively, the alloy can be reflowed below 260°C when special conditions for substrates (i.e. Au-plating over Ni-) and longer temperatures above melting point are being met. The alloy can be used for flux-less soldering, when the soldering substrates materials are free of oxides and/or oily residues. Common practice for flux-free soldering is: Nickel-plated substrates (1.5-2.5μm) protected with an Au-flash (0.2-0.5μm) and soldering in vacuum or inert atmosphere. The Cu-addition suppresses the tendency of whisker formation of pure tin, but promotes the building of SnCu-intermetallics when soldered onto Cu-substrates.

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