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## **Data Sheet: 57 Bismuth-42 Tin-1 Silver**

### **Physical Properties of Bulk Solder**

Solder Alloy Composition	57 Bismuth 42 Tin 1 Silver (weight per cent)
Solidus	138°C
Liquidus	140°C
Density	8.59Mg/m <sup>3</sup>
Coefficient of Thermal Expansion	14 x 10 <sup>-6</sup> K <sup>-1</sup>
Hardness	24 HB
Tensile Strength	<15 MPa (at 20 °C and slow deformation) >55 MPa (at 20 °C and fast deformation)
Thermal Conductivity	0.35 W/cm.°K
Electrical Conductivity	5% IACS

Typical impurity levels for electronic grade are less than:

Au: 0.05	Cu: 0.08	Ni: 0.01	Al: 0.005
Pb: 0.08	Fe: 0.02	Zn: 0.003	As: 0.03
Cd: 0.002			

### **Areas of Application**

The 57% Bismuth, 42% Tin, 1% Silver solder has a low melting point, making it useful for the assembly of devices that are susceptible to temperature damage if conventional solders are used. Although it will not wet directly to glass, quartz and many ceramics, it can be used flux-free when these materials are coated with a nickel barrier layer with a Au-flash. Therefore they find use in glass-metal seals; also, because of their low vapor pressure, they are useful as seals in vacuum systems.

High-Bi solders are very brittle, but due to their low creep resistance, they exhibit a good thermal fatigue behavior if the thermal fatigue cycle is slow. The 1% Ag addition improves the physical properties by its grain refining effects

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