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ELECTRONIC COMPONENTS
AND PACKAGING

Data Sheet: 58 Bismuth-42 Tin

Physical Properties of Bulk Solder

| | |
|----------------------------------|------------------------------------------------------------------------------------|
| Solder Alloy Composition | 58 Bismuth 42 Tin (weight per cent) |
| Solidus | 138°C |
| Liquidus | 138°C |
| Density | 8.72Mg/m ³ |
| Coefficient of Thermal Expansion | 13.78 x 10 ⁻⁶ K ⁻¹ |
| Hardness | 22 HB |
| Tensile Strength | <10 MPa (at 20 °C and slow deformation) >55 MPa (at 20 °C and fast deformation) |
| Thermal Conductivity | 34 W/m.°K |
| Electrical Conductivity | 4.5% 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 | | | |

Application: The eutectic 58% Bismuth, 42% Tin 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.

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