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52 Indium-48 Tin

Physical Properties of Bulk Solder

Solder Alloy Composition	52 Indium 48 Tin (weight per cent)
Solidus	120°C
Liquidus	122°C
Density	7.30Mg/m³
Coefficient of Thermal Expansion	$20.0 \times 10^{-6} K^{-1}$
Young's Modulus	N.A.*). GNm^{-2} (low creep resistance)
Tensile Strength	11.9 MPa (at 20 ºC)
Thermal Conductivity	34 W/m.°K
Electrical Conductivity	11.7% IACS

Typical impurity levels for electronic grade are less then:
Au: 0.05 Cu: 0.08 Ni: 0.01 Al: 0.005
Bi: 0.10 Fe: 0.02 Zn: 0.003 As: 0.03
Cd: 0.002 Pb: 0.10

Areas of Application

The 52% Indium 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. It will wet glass, quartz and many ceramics. Therefore they find use in glass-metal seals; also, because of their low vapor pressure, they are useful as seals in vacuum systems. They retain their plasticity down to liquid-helium temperatures and thus can be used for sealing cryogenic systems.
In-based solders have a good resistance to alkaline corrosion. However, corrosion resistance in the presence of traces of halide ions is not satisfactory, necessitating the use of hermetic seals or conformal coatings.
N.A. *) Not Applicable: High-In solders are very ductile and deform plastically. This makes the Young's Modulus not applicable. The ductility of indium provides for a low creep resistance, but assures a good thermal fatigue behavior. The Sn-addition helps but tensile-strength values are still well below those of Sn-Pb-based solders.