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Data Sheet: 95 Lead-5 Indium

Physical Properties of Bulk Solder

Solder Alloy Composition	95Pb-5In (weight per cent)
Melting range	302-314°C
Density	11.04 Mg/m^3
Thermal conductivity	0.21 $W/cm\ K^{-1}$
Electrical conductivity	5.1% IACS
Coefficient of Thermal Expansion	$29.0 \times 10^{-6}\ K^{-1}$
Tensile strength (est.)	29.8 GNm^{-2}
Shear strength	22.2 GNm^{-2}

Typical impurity levels for electronic grade are less then:

Au: 0.05	Ag : 0.05	Cu: 0.08	Ni: 0.01	Al: 0.0005
Bi: 0.001	Fe: 0.02	Zn: 0.0003	As: 0.0003	Cd: 0.002
Sn: 0.10				

The 95Pb5in-alloy is used for the manufacture of semiconductor components. It combines a higher melting range, with good mechanical strength and thermal fatigue properties. The 5% indium assures wetting to copper leads and Au-flash coated Si-chips in die-attach applications. The melting temperature range is wide enough to permit two-or even three-step soldering. The higher melting range makes the alloy also very suitable for fluxless soldering in an inert or reducing atmosphere.
The 5% In solder requires careful packaging as it forms a rather tenacious surface oxide, requiring a longer and higher temperature profile than the Sn-based high lead solders. The alloy is used in the assembly of diodes and rectifiers in belt furnaces with a forming gas mixture (N2, H2) or cracked anhydrous ammonia (75%H2, 25%N2).

Application: Soldering temperature profile for flux-less, reflow applications should include: minimal at or above 360ºC for a minimal time of 120 seconds. This assumes clean, soldering surfaces and the presence of a reducing- or inert-atmosphere during the soldering cycle. Alternatively, the alloy can be reflowed below 360ºC when special conditions for substrates (i.e. Au-plating over Ni-) and longer temperatures above melting point are being met.
If and when the components are slightly oxidized, a combination of higher temperatures and/or longer soldering temperatures is required.