Product Data Sheet

# Indium Thermal Interface Materials (TIM)

## Introduction

**Thermal interface materials** are useful for a variety of applications, but solder thermal interface materials (sTIM) are especially suited to high-end device cooling. To improve package reliability, it is especially important to choose the right alloy. Indium, in particular, should be considered as a sTIM because of its high thermal conductivity, compressibility (SMA-TIM), and ease of application.

## Specifications

| | |
|---|---|
| Max. Operational Temp. | 125°C |
| Standard Purity Level | 99.99% |
| Typical Size | 25.4mm x 25.4mm x .05-.3mm (1" x 1" x .002"-.012") |

## Applications

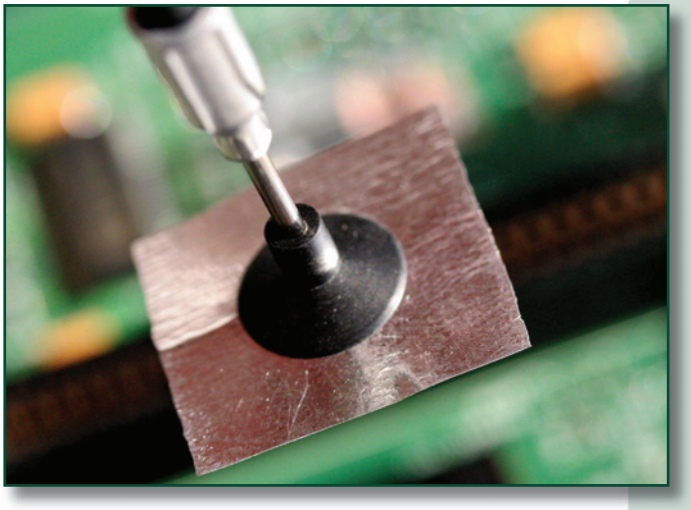
Indium Preforms may be used in a variety of processes.

- **Compressed Between Two Surfaces Without Reflow**
  *(SMA-TIM) Soft Metal Alloy-TIM*
  The extreme malleability of indium allows it to minimize surface resistance – thereby increasing heat flow. The graph below demonstrates this phenomenon.
- **Soldered Between Two Surfaces**
  *(sTIM) Solder-TIM*
  Used to further improve thermal resistance, this application may require the use of a flux to reduce oxides on soldering surfaces.
- **Cold-Welding**
  Another process that is used to create a thermal interface involves reflowing indium preforms onto each solderable surface. The indium-coated surfaces should be cleaned and pressed together to form a fluxless cold-weld solder joint. (See the Application Note: *Etching Indium to Remove Oxides* for more information about this process.)

## Storage and Packaging

Solder Preforms come in a variety of packaging options, including tape and reel. To minimize excessive handling, and exposure to air and subsequent oxidation, Solder Preforms should be packaged according to the quantity used during a typical work shift.

Store Solder Preforms in the original container, closed securely, in 55% RH or less and at temperatures less than 22°C. Solder Preforms can also be stored in an inert atmosphere, such as a nitrogen dry box.



## Properties

| | |
|---|---|
| Indalloy | #4 |
| Electrical Conductivity ('% of IACS) (1.72microhms-cm) | 24 |
| Thermal Conductivity (W/cm °C) (@ 85°C) | .86 |
| Coefficient of Thermal Expansion (µin/µin per °C) (@20°C) | 29 |
| Density (lb/cu. in.) | .2641 |
| Mass Density (gm/cm3) | 7.31 |
| Tensile Strength (PSI) | 273 |
| Shear Strength (PSI) | 890 |
| Young's Modulus (PSI X 10x6) | 1.57 |
| %Elongation | 22 to 41 |
| Brinell Hardness (2mm ball, 4kg load) | 0.9 |
| Latent Heat of Fusion (J/g) | 28.47 |
| Melting Point (°C) | 156.7 |

*All information is for reference only. Not to be used as incoming product specifications.*

## Material Safety Data Sheet

The MSDS for this product can be found online at http://www.indium.com/techlibrary/msds.php

Application Notes on the use of Thermal Interface Materials can be found at http://www.indium.com/techlibrary/applicationnotes.php or email TIM@indium.com.



Form No. 98134 R2

S O L D E R

INDIUM CORPORATION®
www.indium.com
askus@indium.com
PRC +86 (0)512 628 34900
SINGAPORE +65 6268 8678
UK +44 (0) 1908 580400
USA +1 315 853 4900