



# Indigo Xtreme Engineered Thermal Interface (ETI) Kit for LGA 2011

\$22.95

## Product Images



## Short Description

Indigo™ is an ultra-high performing phase change metal alloy (PCMA) thermal interface solution (TIM) that fits neatly between a component and heat sink or coldplate. Unlike greases, metallic thermal interface pads or liquid metal alloys, Indigo is a self-contained and sealed structure, deploying a PCMA which reflows and fills surface asperities. The resultant interfacial layer is void-free and robust, with low thermal contact and bulk resistance.

## Description

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Indigo™ is an ultra-high performing phase change metal alloy (PCMA) thermal interface solution (TIM) that fits neatly between a component and heat sink or coldplate. Unlike greases, metallic thermal interface pads or liquid metal alloys, Indigo is a self-contained and sealed structure, deploying a PCMA which reflows and fills surface asperities. The resultant interfacial layer is void-free and robust, with low thermal contact and bulk resistance.

**IMPORTANT:** Before purchase, please see the Cooler Compatibility Application Note at [www.indigo-xtreme.com](http://www.indigo-xtreme.com) to determine compatibility with your specific water block or cooler.

See attached PDF for Application Notes below.



The Indigo Xtreme ETI is available as part of an Engineered Thermal Interface Kit. This kit includes several cleanroom-grade surface cleaning products for (2) complete installations.

The ETI kit includes:

- Indigo Xtreme ETIs (2 installations)
- Cleanroom-grade dry wiper cloths
- Indigo Xtreme Clean™ (sample size)
- Pair of powder-free nitrile gloves
- Detailed Installation Guide

**\*Note: This Item can not be shipped using DHL\***

## Features

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With its innovative design and excellent surface wetting, Indigo offers the following advantages for high heat flux applications:

High Thermal Performance

High Thermal Performance

- Bulk thermal conductivity >20 W/mK
- Thermal Impedance < 0.04°C-cm<sup>2</sup>/W (@ min. BLT)

## High Reliability

- Fully sealed structure - no mess or migration
- Most consistent performance - applies the correct amount of alloy every time
- Gallium-free

## Fully Reworkable

- Fully compatible with copper and aluminum surfaces
- Peel-and-stick application
- Easy clean up - just peel to remove

## Proven

- Indigo passes TIM2 environmental test conditions for OEM servers with negligible performance change over end-of-line (EOL)
- Independent tests confirm Indigo is highest performing, fully reworkable TIM available today

## Specifications

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### How it Works:

The Indigo TIM is an Engineered Thermal Interface (ETI) that fits neatly between a CPU lid and heat sink (or waterblock) to keep CPUs cooler. Unlike greases, metallic thermal interface pads or liquid metal alloys, Indigo is a self-contained and sealed structure, deploying a Phase Change Metallic Alloy (PCMA) which reflows and fills surface asperities on the CPU lid and heat sink. The resultant interfacial layer is void-free and robust, with low thermal contact and bulk resistance.

Indigo Xtreme™ on Intel Core™ 2 Duo Processor:



Prior to reflow



After reflow

The overall thermal performance of a thermal interface is the sum of the bulk thermal resistance (which is the inverse of bulk thermal conductance) of the material and its two surface contact resistances (on both the CPU lid and heat sink). Greases have good surface wetting properties and therefore they exhibit low contact resistance; however, they have high bulk thermal resistances. Metallic pads possess low bulk thermal resistances, but surface oxidation limits their surface wetting ability, resulting in higher contact resistance.

Indigo achieves high thermal performance through the optimized deployment of molten, oxide-free PCMA, thereby yielding low contact resistance and low bulk resistance. The revolutionary Indigo "flow-in-place" technology deploys, controls and contains the phase change metal alloy during reflow to create an optimized, void-free thermal interface that is unsurpassed in performance and reliability.



At the heart of the one-of-a-kind Indigo ETI is a proven PCMA deployment structure.

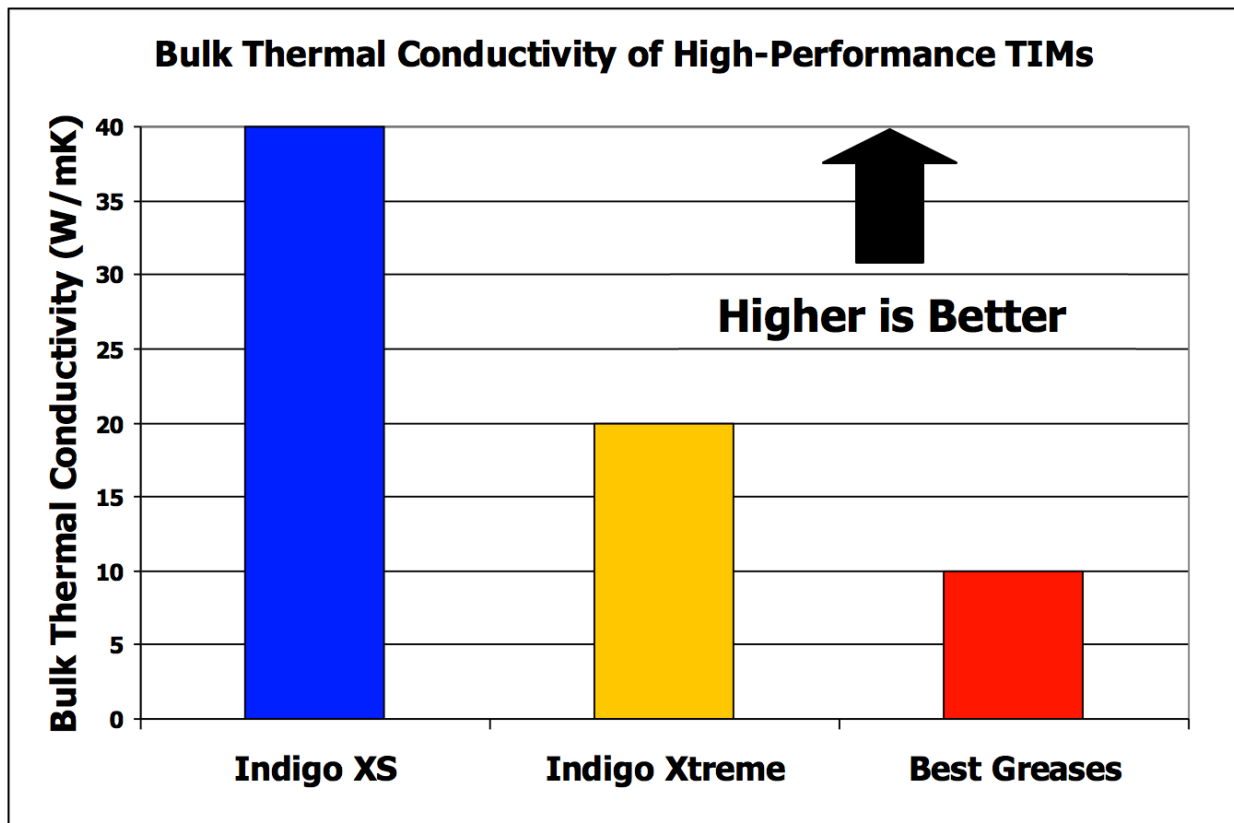
When heated (see Installation Guide), the sealed deployment structure directs flowing PCMA into CPU lid and heat sink micro-surface asperities while flushing out entrapped air. The asperity filling PCMA creates a corrosion-resistant hermetic (airtight) seal between the lid and heat sink, resulting in long-term reliability.

High performance thermal management solutions (heat pipes, liquid cooling, etc) can be limited by the thermal interface material.

The Indigo TIM is the first engineered thermal interface that delivers a void-free, all metal thermal pathway at the critical junction between the processor lid and the primary thermal management hardware.

#### How it Compares:

The Indigo family of thermal interface solutions (TIMs) are precision engineered Phase Change Metal Alloys (PCMA) for professional, high-end applications pushing the heat flux envelope. With excellent surface wetting and high bulk conductivity, Indigo TIMs offer dramatically lower thermal resistance than competing products. It can be seen in following graph that Indigo Xtreme and Indigo XS possess 2X and 4X (respectively) the bulk thermal conductivities of the best aluminum and silver-filled greases and pastes.



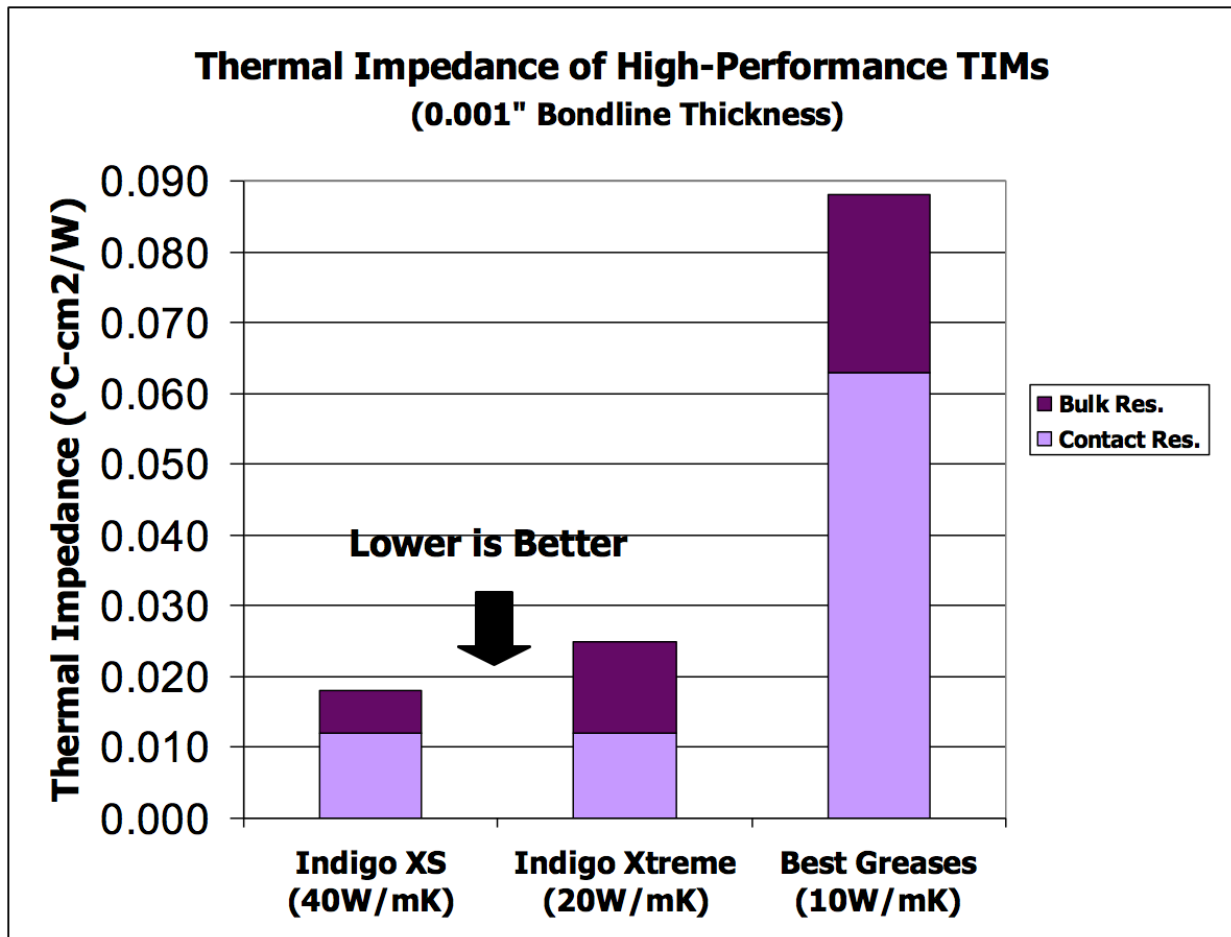
Bulk Thermal Conductivity Data Sources:

1. Indigo XS: IBM Corp, "Metal TIMs for High Power Cooling Applications", IMAPS Symposium 2005.
2. Indigo Xtreme: Indium Corporation, Indalloy Datasheet, 2013.
3. Best Greases: Selected TIM vendor datasheets.

Total TIM Thermal Impedance = Bulk + Contact Resistances

The overall thermal interface impedance/resistance is the sum of the bulk resistance (inverse of bulk thermal conductivity) and contact resistances (both interfacial surfaces). Therefore, for the lowest overall thermal impedance, the bulk thermal conductivity must be maximized and contact resistance must be minimized.

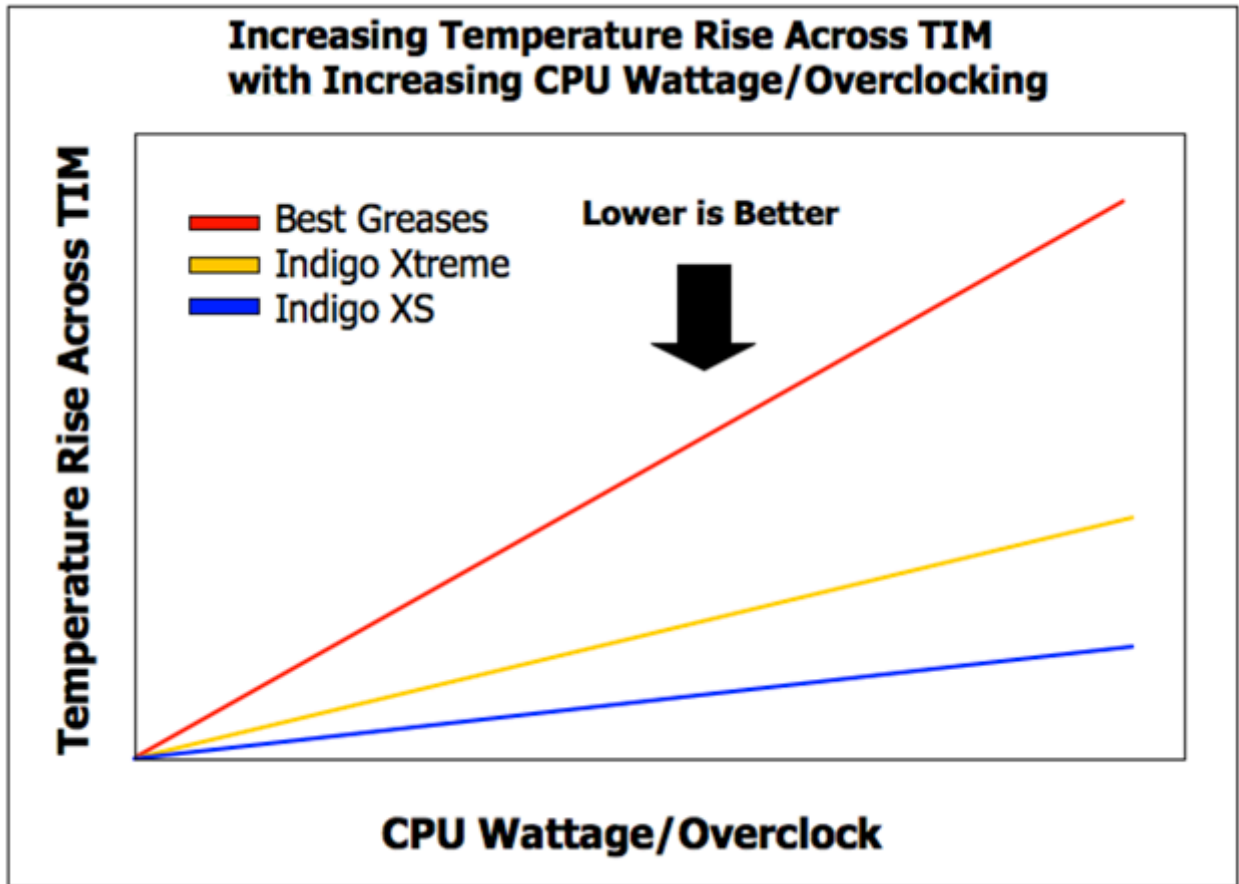
The graph below (ASTM D5470 thermal resistance test results) illustrates the contribution of the bulk thermal resistance and contact resistances for high-performance TIMs. The Indigo family of TIMs achieves low contact resistance through the optimized deployment of highly conductive PCMA, thereby filling the surface micro-asperities on the CPU lid and cooler. The combination of low contact and bulk resistance result in the lowest total thermal resistance of any TIM available.



Higher CPU Wattage/Overclocking = Greater Performance Advantage

With increasing CPU wattage (resulting from overclocking), the temperature rise across any TIM increases. This results in higher core temperatures and degraded CPU performance. For users who operate at stock wattages and frequencies, the performance difference between most high-performance TIMs may be immeasurable. Therefore, a regular thermal grease or paste would be adequate.

However, for the thermal professional or extreme enthusiast who is operating outside the stock performance envelope, the Indigo family of TIMs would provide a significant advantage at these higher wattages. The qualitative graph below illustrates the relationship between total TIM thermal impedance and increasing wattage/overclocking.



It can be seen that the temperature across the best grease TIMs rises sharply with increasing wattage. However, the ultra-low thermal impedance of the Indigo TIMs results in a slight temperature rise. This performance advantage translates to lower overall core temperatures, higher overclocking frequency, increased thermal stability and reliability.

Xtreme Thermal Performance

The Indigo engineered thermal interface solutions are the clear winner over all alternatives for a high-performance TIM.

## Additional Information

Brand	Enerdyne
SKU	2011-X1-D
Weight	0.7500
TIM Type	Phase Change Metal Alloy

