

# Global Metal-based Thermal Interface Materials (TIMs) Market 2026 by Manufacturers, Regions, Type and Application, Forecast to 2032

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## Abstracts

According to our (Global Info Research) latest study, the global Metal-based Thermal Interface Materials (TIMs) market size was valued at US\$ 268 million in 2025 and is forecast to a readjusted size of US\$ 508 million by 2032 with a CAGR of 9.6% during review period.

In 2025, global Metal-based Thermal interface materials (TIMs) sales reached approximately 137 Tons with an average global market price of around 1,894 USD per Kg.

Metal-based thermal interface materials (TIMs) refer to high-performance thermal management materials in which metals or metal alloys serve as the dominant heat-conducting phase. They are used to fill microscopic gaps between chips, power devices, package substrates, heat sinks, cold plates, housings, and other thermal interfaces. Their primary function is to reduce interfacial thermal resistance, improve heat transfer efficiency, and maintain stable contact under high power density, repeated thermal cycling, and high-reliability operating conditions. Typical products include indium sheets, indium foils, indium-based alloy pads, solder preforms, tin-, indium-, and silver-based metallic TIMs, liquid metal TIMs, metal-composite thermal pads, and compressible metallic interface materials for power modules. Compared with conventional silicone pads, thermal greases, and phase-change materials, metal-based TIMs generally offer higher bulk thermal conductivity, lower interface thermal resistance, and stronger high-temperature endurance. They are mainly used in AI chips, GPUs/CPUs, high-performance servers, power semiconductors, SiC/GaN modules, EV power electronics, lasers, aerospace electronics, and high-end communication equipment.

The gross margin of metal-based TIMs is generally estimated at 25%–60%. Standard metal foils, metal-filled composite pads, and general solder preforms are usually in the 25%–40% range, while indium-based alloy pads, liquid metal TIMs, high-reliability power-module metallic interfaces, and semiconductor-packaging-grade customized products can reach 40%–60%. High-end products with long-term customer qualification, locked specifications, and cleanroom-level processing may achieve even higher margins. The upstream value chain includes indium, tin, silver, copper, aluminum, gallium, high-purity metals, alloy ingots, rolled foils, solder powders, and surface-treatment materials. The midstream covers alloy formulation, precision rolling, die cutting, composite calendaring, surface coating, clean packaging, and reliability testing. Downstream demand is concentrated in semiconductor packaging, AI servers, data centers, high-end consumer electronics, power semiconductors, electric vehicles, industrial power supplies, lasers, and defense electronics. Profitability is mainly determined by metal price volatility, purity requirements, customer qualification cycles, thermal resistance targets, batch consistency, and whether the material is designed into a key customer's BOM.

### Market Development Opportunities & Main Driving Factors

The growth of metal-based TIMs is primarily driven by higher chip power density, more complex packaging architectures, and the redesign of thermal pathways. AI GPUs, HBM, advanced packaging, chiplets, power semiconductors, and liquid-cooled servers are turning thermal management from an auxiliary material category into a system-level bottleneck. DOE/LBNL data show that U.S. data centers accounted for about 4.4% of total U.S. electricity consumption in 2023 and are expected to reach around 6.7%–12% by 2028, highlighting the high-heat-flux expansion cycle of AI computing infrastructure. NVIDIA also reported fiscal 2026 full-year revenue of USD 215.9 billion and fourth-quarter data center revenue of USD 62.3 billion, confirming the scale-up of high-performance computing hardware and the rising value of advanced TIM materials. In parallel, the European Chips Act strengthens advanced chip manufacturing, packaging, testing, and supply-chain resilience. The European Commission has approved more than EUR 31.5 billion of public and private semiconductor investments, which will further support localized demand for advanced packaging, power devices, and thermal management materials.

### Market Challenges, Risks, & Restraints

Although metal-based TIMs offer clear performance advantages, their

commercialization threshold is higher than that of conventional silicone pads, thermal gels, and graphite sheets. Key metals such as indium, gallium, and silver are exposed to price volatility, supply concentration, incomplete recycling systems, and geopolitical trade risks, creating pressure on long-term quotation and inventory management. In addition, metal TIMs must simultaneously deliver low thermal resistance, low contact pressure, oxidation resistance, corrosion resistance, pump-out resistance, CTE mismatch tolerance, and long-term thermal cycling reliability. Instability in any of these factors can delay adoption in GPUs, power modules, and automotive electronics. Customer qualification cycles are also long, especially in semiconductor, automotive, aerospace, and defense applications, where materials must pass multiple rounds of reliability testing, process adaptation, and batch-consistency validation. As a result, industry competition will shift from simple thermal conductivity comparison toward integrated capability in material design, interface engineering, precision processing, customer qualification, and supply-chain security.

### Downstream Demand Trends

Downstream demand will become more premium, customized, and system-integrated. AI servers and data centers will continue to drive demand for low-resistance metallic TIMs, liquid metal TIMs, indium-based pads, and solder preforms for advanced packaging. Electric vehicles and industrial power systems will place greater emphasis on long-term reliability and high-temperature endurance in SiC/GaN power modules, traction inverters, onboard chargers, DC-DC converters, and battery thermal management systems. The IEA expects global electric car sales to exceed 20 million units in 2025, representing more than one-quarter of global car sales, which will continue to expand demand for power semiconductors and thermal management materials in vehicle power electronics. From the customer procurement perspective, metal-based TIMs are no longer merely auxiliary heat-dissipation materials; they are becoming key engineered materials co-designed with chip packaging, module structures, liquid-cooling systems, and system-level reliability. Suppliers with high-purity metal access, alloy formulation expertise, precision processing capability, and qualification experience with leading customers are better positioned to capture premium opportunities in AI hardware, power semiconductors, and EV thermal management upgrades.

This report is a detailed and comprehensive analysis for global Metal-based Thermal Interface Materials (TIMs) market. Both quantitative and qualitative analyses are presented by manufacturers, by region & country, by Type and by Application. As the market is constantly changing, this report explores the competition, supply and demand

trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

#### Key Features:

Global Metal-based Thermal Interface Materials (TIMs) market size and forecasts, in consumption value (\$ Million), sales quantity (Tons), and average selling prices (US\$/kg), 2021-2032

Global Metal-based Thermal Interface Materials (TIMs) market size and forecasts by region and country, in consumption value (\$ Million), sales quantity (Tons), and average selling prices (US\$/kg), 2021-2032

Global Metal-based Thermal Interface Materials (TIMs) market size and forecasts, by Type and by Application, in consumption value (\$ Million), sales quantity (Tons), and average selling prices (US\$/kg), 2021-2032

Global Metal-based Thermal Interface Materials (TIMs) market shares of main players, shipments in revenue (\$ Million), sales quantity (Tons), and ASP (US\$/kg), 2021-2026

#### The Primary Objectives in This Report Are:

- To determine the size of the total market opportunity of global and key countries
- To assess the growth potential for Metal-based Thermal Interface Materials (TIMs)
- To forecast future growth in each product and end-use market
- To assess competitive factors affecting the marketplace

This report profiles key players in the global Metal-based Thermal Interface Materials (TIMs) market based on the following parameters - company overview, sales quantity, revenue, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Indium Corporation, MacDermid Alpha, Ningbo SJE Electronics, Winchain Material Technology, Arieca, Inspiraz Technology Pte Ltd, AIM Specialty Materials, Thermal Grizzly, Sino

Santech Materials Technology Co., Ltd., Hunan Aster Materials Technology Co., Ltd., etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

## Market Segmentation

Metal-based Thermal Interface Materials (TIMs) market is split by Type and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for consumption value by Type, and by Application in terms of volume and value. This analysis can help you expand your business by targeting qualified niche markets.

### Market segment by Type

Indium Foil / Sheet

Indium Preform

Solder TIM

Compressible Metal TIM

Liquid Metal TIM

Phase-change Metal Alloy TIM

Others

### Market segment by Metal System

Indium-based

Indium-Silver Alloy

Gallium-based Liquid Metal

Bismuth-Indium-Tin Alloy

Others

#### Market segment by TIM Position

TIM1

TIM1.5

TIM2

Others

#### Market segment by Application

Semiconductor & Advanced Packaging

Data Centers & AI Computing

Automotive & EV

Industrial & Power Systems

Consumer Electronics

Aerospace, Defense & Research

Others

#### Major players covered

Indium Corporation

MacDermid Alpha

Ningbo SJE Electronics

Winchain Material Technology

Arieca

Inspiraz Technology Pte Ltd

AIM Specialty Materials

Thermal Grizzly

Sino Santech Materials Technology Co., Ltd.

Hunan Aster Materials Technology Co., Ltd.

Changsha Kunyong New Materials Co., Ltd.

ESPI Metals

Shenzhen Beichuan Lihe Technology

Inspiraz Technology

Market segment by region, regional analysis covers

North America (United States, Canada, and Mexico)

Europe (Germany, France, United Kingdom, Russia, Italy, and Rest of Europe)

Asia-Pacific (China, Japan, Korea, India, Southeast Asia, and Australia)

South America (Brazil, Argentina, Colombia, and Rest of South America)

Middle East & Africa (Saudi Arabia, UAE, Egypt, South Africa, and Rest of Middle East & Africa)

The content of the study subjects, includes a total of 15 chapters:

Chapter 1, to describe Metal-based Thermal Interface Materials (TIMs) product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top manufacturers of Metal-based Thermal Interface Materials (TIMs), with price, sales quantity, revenue, and global market share of Metal-based Thermal Interface Materials (TIMs) from 2021 to 2026.

Chapter 3, the Metal-based Thermal Interface Materials (TIMs) competitive situation, sales quantity, revenue, and global market share of top manufacturers are analyzed emphatically by landscape contrast.

Chapter 4, the Metal-based Thermal Interface Materials (TIMs) breakdown data are shown at the regional level, to show the sales quantity, consumption value, and growth by regions, from 2021 to 2032.

Chapter 5 and 6, to segment the sales by Type and by Application, with sales market share and growth rate by Type, by Application, from 2021 to 2032.

Chapter 7, 8, 9, 10 and 11, to break the sales data at the country level, with sales quantity, consumption value, and market share for key countries in the world, from 2021 to 2026. and Metal-based Thermal Interface Materials (TIMs) market forecast, by regions, by Type, and by Application, with sales and revenue, from 2027 to 2032.

Chapter 12, market dynamics, drivers, restraints, trends, and Porters Five Forces analysis.

Chapter 13, the key raw materials and key suppliers, and industry chain of Metal-based Thermal Interface Materials (TIMs).

Chapter 14 and 15, to describe Metal-based Thermal Interface Materials (TIMs) sales channel, distributors, customers, research findings and conclusion.

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