

Global Dual-Use Phase Change Material (PCM) for Thermal Management Market 2026 by Manufacturers, Regions, Type and Application, Forecast to 2032

<https://marketpublishers.com/r/G0168786A4A6EN.html>

Date: June 2026

Pages: 170

Price: US\$ 3,480.00 (Single User License)

ID: G0168786A4A6EN

Abstracts

According to our (Global Info Research) latest study, the global Dual-Use Phase Change Material (PCM) for Thermal Management market size was valued at US\$ 803 million in 2025 and is forecast to a readjusted size of US\$ 5084 million by 2032 with a CAGR of 30.1% during review period.

Dual-Use Phase Change Material (PCM) for Thermal Management refers to PCM technologies, products or solutions that are applicable both to military equipment thermal management (e.g., missile-borne phased-array radar TR modules, high-power electronic warfare systems, infrared stealth, naval/armored platforms, individual soldier thermal protection) requiring high reliability, high power density, and harsh environment adaptability, and to civilian high-value applications (EV/ESS thermal runaway prevention, AI server PUE optimization, cold-chain logistics, building energy efficiency, smart wearables, automotive thermal comfort seats), enabling synergy in technology and supply chain. It features passive thermal management, buffering transient thermal shocks and stabilizing temperature. It excludes common thermal insulation materials and active cooling systems, and covers organic, inorganic, and composite PCMs (microencapsulated, porous scaffold, thermally enhanced, structure-thermal-stealth integrated).

Dual-use phase change materials (PCM) for thermal management epitomize the same technology, different markets paradigm. In military applications, missile-borne phased-array radar TR modules, high-power electronic warfare systems, and hypersonic vehicles demand PCM that can absorb hundreds of watts per square centimeter within milliseconds to seconds while surviving extreme mechanical stress. This creates extremely high technological barriers, unit prices ranging from tens of

thousands to hundreds of thousands of dollars, and gross margins often exceeding 50%. In civilian markets, battery thermal runaway prevention, AI data center peak shaving, and cold chain logistics require PCM to shift from ?high reliability? to ?high cost?effectiveness?, with gross margins typically 20?35%, but market size grows exponentially. Pricing: commodity organic paraffin PCM sells for USD 2?5/kg, micro?encapsulated PCM USD 10?30/kg, while military?grade composite cold plates or packaged modules can cost USD 500?2,000/unit. Margins reflect this tiering: Yangtze Optical Electronic (688143), KULR, and ACT maintain 45?65% gross margins; Outlast, leveraging patent licensing and brand, enjoys 40?50%; civilian leaders such as Nabai Chuan and Hangzhou Ruhr achieve 25?35%; low?end building PCM has become a red ocean with margins below 15%. Downstream: military electronics (missiles, radars, EW) account for ~25% of the dual?use PCM market by value (highest unit value), battery thermal runaway protection ~30% (fastest growth, CAGR >35%), cold chain logistics ~20%, data centers & AI servers ~10%, building energy efficiency & smart textiles ~10%, aerospace ~5%. Incremental demand is driven by: (1) China?s military electronics upgrade ? active phased?array radars and missile?borne TR modules are shifting from ?optional? to ?mandatory? for PCM cold plates; (2) EV penetration exceeding 50% and new safety standards for grid?scale storage driving battery PCM module growth >35% annually; (3) mandatory PUE 2000?)

Infrared Signature Control

Market segment by Application

Military Electronics (Missile?borne Radar, EW, TR modules)

Aerospace & Hypersonic Vehicles

Electric Vehicle & Energy Storage Battery Pack

Data Center & AI Server Cooling

Passive Cold Chain Shipping

Building Energy Efficiency & Smart Textile

Others

Major players covered

Yangtze Optical Electronic (688143)

KULR Technology Group

Advanced Cooling Technologies (ACT)

Outlast Technologies

Nabai Chuan

Aavid (Boyd Corporation)

Hangzhou Ruhr New Material Technology

va-Q-tec

Shuangliang Energy Saving

Shandong Xiyu Technology

Ningbo Innovation Navigation

Shugang Digital Creation

RuhrTech

Sidike (300806)

TE Connectivity

Molex

Xidian Jubian

Guangdong Changnengda

Shenzhen Senruo New Material

Tan90

Wisesource Hechuang (01116.HK)

Gree Electrical Appliances

Ningbo Panji New Material Technology

Yangtze Optical Electronic Thermal Control Tech

Zite New Materials

Domoan

Beijing Reshu

Shenggui Bianhuan

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 Dual-Use Phase Change Material (PCM) for Thermal Management product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top manufacturers of Dual-Use Phase Change Material (PCM) for Thermal Management, with price, sales quantity, revenue, and global market share of Dual-Use Phase Change Material (PCM) for Thermal Management from 2021 to 2026.

Chapter 3, the Dual-Use Phase Change Material (PCM) for Thermal Management competitive situation, sales quantity, revenue, and global market share of top manufacturers are analyzed emphatically by landscape contrast.

Chapter 4, the Dual-Use Phase Change Material (PCM) for Thermal Management 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 Dual-Use Phase Change Material (PCM) for Thermal Management 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 Dual-Use Phase Change Material (PCM) for Thermal Management.

Chapter 14 and 15, to describe Dual-Use Phase Change Material (PCM) for Thermal Management sales channel, distributors, customers, research findings and conclusion.

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