

Cryocooler Market Report and Forecast 2025-2034

Market Report | 2025-08-11 | 157 pages | EMR Inc.

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Report description:

The global cryocooler market size reached approximately USD 3.30 Billion in 2024 . The market is projected to grow at a CAGR of 7.20% between 2025 and 2034, reaching a value of around USD 6.61 Billion by 2034 .

A cryocooler is defined as a type of refrigerator that is designed to reach cryogenic temperatures. The cryogenic temperature can go lower than -153 C. It is usually used in the healthcare sector, military and defence sector, and space research, among others, where it cools down the high-powered superconducting magnets.

The global cryocooler market growth is driven by the rising demand for cryocoolers in semiconductor applications. The semiconductors are a crucial component in the military and defence sector, where the development of IR sensors and satellite surveillance systems require cryocoolers. Furthermore, the flourishing healthcare sector and the increasing government investment to upgrade the existing healthcare infrastructure are likely to bolster the demand for cryocoolers. Additionally, the increasing demand for MRI, cryosurgery, and liquefaction of oxygen due to the increase in hospitalisation rate, globally is expected to significantly contribute to the market growth in the forecast period.

Key Trends and Developments

Space exploration; growing LNG production; quantum computing; and technological innovations are the major trends impacting the cryocooler market development

April, 2024

Bluefors launched the Cryomech HeRL02-RM, a newly developed Helium Reliquefier, engineered specifically to facilitate helium recovery from individual Nuclear Magnetic Resonance (NMR) units.

February, 2024

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EKWB, known for its high-performance cooling solutions, announced that it has acquired the technology behind Intel's discontinued cryo cooling system.

October, 2023

Fabrum, a New Zealand-based leader in zero-emission technologies aimed at fostering a lower-carbon economy, completed the acquisition of Alec Farrar Engineering Limited, which is known for its engineering manufacturing and foundry services.

February, 2023

Bluefors, a Finnish company specialising in cryogenic measurement systems, announced its plans to acquire Cryomech, a leader in cryocooler technology and manufacturing based in the United States.

Space exploration

Cryocoolers play a key role in space applications, particularly in the cooling of instruments used in space telescopes and other spacecraft systems.

Growing LNG production

Cryocoolers are essential in LNG plants for reliquefying boil-off gas, which helps in managing and maintaining the storage and transportation of LNG.

Quantum computing

The need for maintaining extremely low temperatures to ensure stable quantum states has positioned cryocoolers as a critical component of quantum computers.

Technological innovations

Innovations in reducing vibration and increasing the lifespan of cryocoolers are making them more suitable for a broader range of application

Cryocooler Market Trends

Cryocoolers play a crucial role in space applications by providing the necessary cooling for instruments on space telescopes and other spacecraft systems. Many space-bound instruments, such as sensors and detectors, operate most effectively at cryogenic temperatures, which can be as low as a few Kelvin above absolute zero. These low temperatures are essential for reducing thermal noise, which can interfere with the instrument's sensitivity and accuracy.

Market players are diversifying their product range and strengthening their position in the cryocooler market by adopting a technology that provides a competitive edge in high-performance cooling. EKWB, known for its high-performance cooling solutions, acquired the technology behind Intel's discontinued Cryo Cooling system. The EK Delta TEC water block is a product that uses this thermoelectric cooling technology. By integrating Intel's TEC technology, EKWB can push the limits of what's possible in terms of cooling performance in PC setups.

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Market Segmentation

"Cryocooler Market Report and Forecast 2025-2034" offers a detailed analysis of the market based on the following segments:

Market Breakup by Type

- Pulse-Tube (PT)
- Gifford-McMohan (GM)
- Joule-Thomson (JT)
- Brayton
- Stirling

Market Breakup by Application

- Space
- Healthcare
- Military and Defence
- Others

Market Breakup by Region

- North America
- Europe
- Asia Pacific
- Latin America
- Middle East and Africa

Gifford-McMahon (GM) cryocooler accounts for a major cryocooler market share owing to its widespread application across various sectors requiring reliable and efficient cooling solutions

On the basis of type, the Gifford-McMahon cryocoolers are anticipated to account for a significant share of the market, as they are easy to maintain and are ideal for recondensing cryogens in the temperature range of 25 to 125K. They are also favoured for their robust performance in low-frequency applications, where they can effectively maintain extremely low temperatures, making them ideal for use in cryo vacuum systems and scientific research.

On the other hand, Stirling cryocoolers are gaining popularity due to their efficiency and versatility in cooling applications, particularly in military and aerospace sectors where precise temperature control is critical.

The healthcare sector maintains its dominance in the market due to the growing usage of cryocoolers in healthcare equipment

Based on application, the healthcare sector is likely to account for a significant share of the cryocooler market in the forecast period. Cryocooler is a crucial component for MRI, NMR equipment, cryosurgery, liquefaction of oxygen, and proton therapy, among others. Over the forecast period, technological advancements and the modification of hospitals and cancer treatment centres are likely to bolster the demand for cryocoolers. For instance, proton therapy is used in highly advanced treatment centres in order to treat head and neck cancer, paediatric cancers, spine tumours, and breast cancers, among others. Therefore, this factor will propel the demand for cryocoolers, as the product is used for cooling down the high-powered superconducting magnets used in proton therapy.

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Meanwhile, the military and defence sector is likely to hold a considerable share of the cryocooler market owing to the strong demand for cryocoolers for sensitive equipment. Cryocoolers are essential for cooling infrared sensors used in night vision devices, which are critical for modern military operations

Cryocooler Market Analysis by Region

The presence of the major key payers and the rapid industrialisation in the region are likely to bolster the market growth in the forecast period. Some of the countries of North America, such as the United States, are ahead in terms of military and space innovations. The strong research and development in the field of space carried out by NASA will further propel the demand for cryocoolers in the coming years. In addition, the market is expected to be aided by the growing technological advancements in the healthcare infrastructure.

The demand for cryocoolers market in the Asia Pacific region is growing rapidly due to several factors. The region is witnessing a surge in healthcare advancements, with increased investments in medical imaging technologies like MRI systems and proton therapy, all of which require cryocoolers to operate efficiently.

Competitive Landscape

The market players are increasing their collaboration and research and development activities to gain a competitive edge in the cryocooler market

Superconductor Technologies Inc.

Superconductor Technologies Inc. is a company focused on developing and commercializing high-temperature superconductor (HTS) materials and related technologies.

Northrop Grumman

Northrop Grumman is a global aerospace and defence technology company that provides innovative systems, products, and solutions in autonomous systems, cyber, and space, among others.

Sumitomo Heavy Industries, Ltd.

Sumitomo Heavy Industries, Ltd. is a Japanese company with a diverse portfolio that includes general machinery, shipbuilding, and construction equipment.

SunPower Corporation.

SunPower Corporation. is known for its production of high-efficiency solar panels and systems and provides solar products and services for residential, commercial, and utility-scale power plant projects.

Other market players include Brooks Automation, Inc., among others.

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