

Cryocooler - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

Market Report | 2024-02-17 | 136 pages | Mordor Intelligence

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Report description:

The Cryocooler Market size is estimated at USD 3.26 billion in 2024, and is expected to reach USD 4.45 billion by 2029, growing at a CAGR of 6.40% during the forecast period (2024-2029).

Key Highlights

- Technological development of cryocooler technology significantly expanded the use of these devices, as they can extend from a hospital magnetic resonance imaging (MRI) machine to military night vision devices to even longwave instruments on a space telescope.
- Some of the major factors driving the adoption of cryocoolers included the growing adoption across the military and defense sectors to maintain cryogenic temperatures for IR sensors installed in night-vision-based systems. The use of night vision devices has significantly increased in the last few years as countries advance their defense capabilities. Moreover, countries are increasing their military spending to adopt new technologies. As per SIPRI, in 2022, the United States spent around USD 876.94 billion on its military.
- Further, cryocoolers are used extensively in defense applications, mainly for the cooling of infrared focal planes. Quite specifically, cryocoolers are typically used to cool intrinsic semiconductor-type focal planes for mid-wave infrared (nominally 3-5-micron wavelength) and longwave infrared (nominally 9-12 micron) sensors.
- A significant number of improvements to cryocoolers have occurred in the past two decades, which, in turn, have allowed many more applications of cryogenics to flourish and find their way into the marketplace.
- Cooling of infrared and visible cameras continues to provide opportunities for small cryocoolers. While recent years have witnessed a shift from cooled to uncooled IR cameras, a market remains for high-performance infrared imagers cooled by small Stirling cycle cryocoolers.
- Developing spacecraft thermal management systems that depend on predictable cryocooler performance is one of the most

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challenging aspects of space thermal system design. Most of the developers rely on very sparse cryocooler performance data when conducting their system-level trade-offs.

Cryocooler Market Trends

Healthcare to be the Largest End-user Vertical

- Cryocoolers are in high demand in healthcare due to their widespread application in MRI systems, cryosurgery, and proton therapy. Cryocoolers are used to keep the superconducting magnets in this medical equipment cool. The continued study and development of cryocoolers have enhanced their acceptance in the healthcare industry for various applications.
- The high input power consumption of cryocoolers is claimed to be a limitation. However, the benefits of using cryocoolers in healthcare exceed the drawbacks. The use of cryocoolers in magnetic resonance image (MRI) and nuclear magnetic resonance (NMR) equipment is increasing in the medical field. There are also technological advancements.
- The rise in the number of medical machines would create an opportunity for the studied market to grow. According to the Organization for Economic Co-operation and Development (OECD), Over 37.99 MRI units were available per every million of its population in the United States last year, and New Zealand had 16.62 MRI units available per every million of its population.
- Additionally, the Indian Council of Medical Research (ICMR) and Indian Institutes of Technology (IITs) cooperated in establishing 'ICMR at IITs' by establishing Centers of Excellence (CoE) for Make-in-India product development and commercialization in the medical devices space. According to IBEF, FDI inflows into the medical and surgical appliances sector totaled USD 2.71 billion from April 2000 to June 2022.
- In addition, cryocoolers also find use in cryopreservation, which is a process that preserves cells, tissues, organelles, or any other biological construct by cooling the samples to very low temperatures. The technologies and understanding of cell and tissue cryopreservation have developed rapidly. There is widespread application of cryobiology in many areas, including reproductive medicine, hematopoietic stem cell treatments in cancer, targeted immune cell therapies such as CAR T-cells, and animal and plant gene banks.
- According to the IARC's World Cancer Report, despite constant progress in cancer prevention and treatment, the global cancer burden kept growing, as the number of new cases was anticipated to increase by 50% between 2018 and 2040. The IARC recognized 10.1 million new cancer cases in 2000 and 18.1 million in 2018 and expects 27 million new cases annually by 2040. Such factors are expected to drive the demand for cryocoolers.

North America is Expected to Hold the Largest Share

- North America is significantly driving the growth of cryocoolers in the market due to rising investment in the military and healthcare sectors. According to SIPRI, the United States led the ranking of countries with the highest military spending in 2022, with USD 876.94 billion dedicated to the military.
- Government space organizations in the United States have invested significant research and development funds in introducing innovative cryogenic cooling technology. This will help the space sector in the country grow in the coming years. According to the US Congressional Budget Office, between 2013 and 2022, the United States spent USD 392 billion on nuclear weapons, USD 97 billion on missile defenses, and USD 100 billion on environmental and health costs.
- In the healthcare sector, the rising demand for cryocoolers in the region is attributed to their extensive utilization in proton therapy, cryosurgery, MRI systems, and the liquefaction of oxygen in hospitals. The region is a significant developer of new cancer drugs and rapidly evolving technologies, such as cryocooler devices, with the most prominent groups aimed at treating solid tumors, lung cancer, and leukemia.

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- Proton therapy for lung and brain cancer has proven to be a reasonable treatment for patients whose cancer is limited to the local area. Brain tumors are the leading cause of cancer-related death among children ages 0-14. The expansion in the cases of the cancers mentioned above in the region may drive the growth of proton therapy, thereby driving the studied market growth. According to the National Association of Proton Therapy, 42 proton therapy centers are treating patients in the United States.
- Since cryocoolers are used to maintain cryogenic temperatures for IR sensors installed in night vision-based systems, satellite-based surveillance, and missile guidance, the growing demand for cryocoolers across North America's military and surveillance sectors has been boosting the cryocoolers market in the region.

Cryocooler Industry Overview

The cryocooler market is home to multiple key players, including Sumitomo and Barry Automation Inc., alongside other contenders, all striving for prominence within this moderately fragmented market space. These companies have embraced potent competitive strategies, such as product innovations, investments, acquisitions, and strategic partnerships, in order to maintain their relevance and competitive edge in the market. During the study period, the competitive rivalry within the market exhibited a moderately high level of intensity.

In March 2023, Cryomech Inc. unveiled the industry-leading PT450 Pulse Tube Cryocooler and CP3000-Series Helium Compressor at the American Physical Society (APS) March 2023 Meeting.

In February 2023, Bluefors (Cryomech Inc.), a manufacturer of cryogenic measurement systems, made a strategic announcement regarding its intention to acquire Cryomech. This acquisition is poised to bolster the company's capabilities and expand its presence to new regions, including Finland, the Netherlands, and the United States.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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