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Global Zero Boil-off Superconducting Magnet Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Zero Boil-off Superconducting Magnet market size is expected to reach $ 1121 million by 2032, rising at a market growth of 5.5% CAGR during the forecast period (2026-2032).

Zero boil-off superconducting magnets are superconducting magnet systems that achieve near-zero liquid helium evaporation loss using cryogenic cooling technology. Traditional superconducting magnets typically rely on liquid helium to maintain the operation of superconducting coils in extremely low-temperature environments. However, liquid helium continuously evaporates during long-term operation, requiring periodic replenishment. Zero-volatility superconducting magnets, by integrating a cryogenic refrigerator, a re-condensation system, and a highly efficient vacuum insulation structure, re-condense the evaporated helium back into a liquid state for recycling, thus significantly reducing or even virtually eliminating liquid helium consumption.

The upstream of the industry chain mainly includes suppliers of superconducting materials, cryogenic cooling equipment, and precision electronic components. Core raw materials include superconducting wires such as NbTi (niobium-titanium) and Nb?Sn (niobium-tin), high-purity copper, cryogenic insulation materials, and liquid helium cooling-related components; it also involves key supporting equipment such as GM refrigerators, pulse tube refrigerators, vacuum insulation systems, power control modules, and magnetic field monitoring systems. The midstream segment primarily comprises companies designing, winding, cryogenically integrating, homogenizing magnetic fields, and manufacturing complete zero-volatile superconducting magnet systems. This segment has extremely high technological barriers, requiring capabilities in superconducting magnet design, cryogenic engineering, stable magnetic field control,

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and low-liquid helium circulation management. Midstream manufacturers typically supply MRI superconducting magnets, NMR magnets, high-field research magnets, and customized cryogenic magnetic systems. Downstream applications are mainly concentrated in medical MRI (magnetic resonance imaging), NMR spectrometers, high-energy physics, particle accelerators, fusion experiments, quantum computing, and cryogenic research.

In 2025, global sales of zero boil-off superconducting magnets reached 4,800 units, with a production capacity of approximately 6,800 units. The average selling price was US$157,000 per unit, and the average gross profit margin was 25%-35%.

Zero boil-off superconducting magnets have become a key development direction in the superconducting magnet industry, with the global market primarily dominated by large medical imaging and research equipment companies in Europe, America, and Japan. Medical MRI remains the largest commercial application area, accounting for over 70% of overall demand.

In terms of demand structure, zero-volatility superconducting magnets are currently mainly used in MRI, NMR, high-field research, fusion energy, and quantum computing. MRI is the core source of demand, primarily driven by the global aging population and the increasing demand for diagnostics of tumors and neurological diseases. In recent years, rising liquid helium prices and supply shortages have also significantly accelerated the adoption of 'low liquid helium' and 'zero-volatility' solutions by medical institutions. Simultaneously, the development of high-field NMR, particle physics experiments, nuclear fusion, and quantum computing is driving increased demand for highly stable, high-magnetic-field zero-volatility magnets. Especially in the fusion energy field, high-temperature superconducting magnets have become an important technological route for next-generation compact fusion devices.

In terms of products and technology routes, the industry is continuously evolving from traditional liquid helium bath-type superconducting magnets towards 'low liquid helium,' 'closed-loop recycling,' and 'liquid helium-free' technologies. Currently, the mainstream commercial approach still revolves around NbTi cryogenic superconducting materials combined with GM or Pulse Tube cryogenic refrigerators, achieving zero volatilization through a closed-loop liquid helium cycle.

This report studies the global Zero Boil-off Superconducting Magnet production, demand, key manufacturers, and key regions.

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This report is a detailed and comprehensive analysis of the world market for Zero Boil-off Superconducting Magnet and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Zero Boil-off Superconducting Magnet that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global Zero Boil-off Superconducting Magnet total production and demand, 2021-2032, (Units)
Global Zero Boil-off Superconducting Magnet total production value, 2021-2032, (USD Million)
Global Zero Boil-off Superconducting Magnet production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Units), (based on production site)
Global Zero Boil-off Superconducting Magnet consumption by region & country, CAGR, 2021-2032 & (Units)
U.S. VS China: Zero Boil-off Superconducting Magnet domestic production, consumption, key domestic manufacturers and share
Global Zero Boil-off Superconducting Magnet production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Units)
Global Zero Boil-off Superconducting Magnet production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Units)
Global Zero Boil-off Superconducting Magnet production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Units)

This report profiles key players in the global Zero Boil-off Superconducting Magnet market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Philips Healthcare, JEOL, Bruker, Canon Medical Systems, Japan Superconductor Technology (JASTEC), Tesla Engineering, American Magnetics, Cryomagnetics, Siemens Healthineers, GE HealthCare, etc.

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

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Zero Boil-off Superconducting Magnet market

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Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Units) and average price (K US$/Unit) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Zero Boil-off Superconducting Magnet Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Zero Boil-off Superconducting Magnet Market, Segmentation by Type:

Solenoid Type

Open Type

Global Zero Boil-off Superconducting Magnet Market, Segmentation by Magnetic Field Strength:

?1T

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1-3T

?3T

Global Zero Boil-off Superconducting Magnet Market, Segmentation by Superconducting Materials:

Low-Temperature Superconductivity

High-Temperature Superconductivity

Global Zero Boil-off Superconducting Magnet Market, Segmentation by Application:

Medical Imaging

Scientific Research

Industrial Manufacturing

Others

Companies Profiled:

Philips Healthcare

JEOL

Bruker

Canon Medical Systems

Japan Superconductor Technology (JASTEC)

Tesla Engineering

American Magnetics

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Cryomagnetics

Siemens Healthineers

GE HealthCare

Jianxin Superconducting

United Imaging Healthcare

Xingaoyi

Key Questions Answered:
1. How big is the global Zero Boil-off Superconducting Magnet market?
2. What is the demand of the global Zero Boil-off Superconducting Magnet market?
3. What is the year over year growth of the global Zero Boil-off Superconducting Magnet market?
4. What is the production and production value of the global Zero Boil-off Superconducting Magnet market?
5. Who are the key producers in the global Zero Boil-off Superconducting Magnet market?
6. What are the growth factors driving the market demand?

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