

# Immersion Cooling Market Valued at USD 400 Million in 2024, Projected to Grow at 22.5% CAGR Through 2035

Immersion Cooling Market was valued at USD 400 million in 2024 and is projected to grow at a CAGR of 22.5% during the forecast period (2025-2035).

INDORE, INDIA, April 29, 2025 /EINPresswire.com/ -- The global immersion cooling industry is experiencing rapid growth with a variety of significant drivers. The exponential growth of demand-driven data centers for high-performance computing, artificial intelligence, and cloud services is fueling the need for improved thermal management efficiency. Immersion cooling has several significant advantages over conventional air cooling, including greater energy efficiency, reduced operating cost, and higher system reliability. These advantages are most appealing to hyperscale data centers and green-strategy companies looking to lower carbon emissions. The demand is also spurred by increasing awareness and supportive government



policies encouraging energy-efficient infrastructure. R&D investment is also being made by market leaders to be at the forefront and develop new products, driving adoption. According to the International Energy Agency (IEA), in July 2023, the US, where annual investment in data center construction has doubled in the past two years alone, although other major economies, such as China and the European Union, are also witnessing an increase in activity. In 2023, total capital expenditure by industry leaders Google, Microsoft, and Amazon in AI adoption and data center deployment was greater than the total for the US oil and gas industry as a whole,

amounting to approximately 0.5% of US GDP.

Further, the compactness and scalability of immersion cooling solutions are gaining popularity with edge computing and modular data center deployments. The Asia-Pacific region, in particular, is growing at a high rate following the development of IT infrastructure and positive economic policies. Technological advancements and increased availability of dielectric fluids have also contributed to growing the market by making immersion cooling relatively cheaper and more economical.

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#### Market Trends

Rising Demand in Hyperscale Data Centers

The Immersion Cooling market globally is growing at a considerable rate, owing to increasing demand from hyperscale data centers. The growth is backed by the increased need for more efficient, green, and performance-oriented thermal management solutions capable of keeping up with the explosive growth of data processing and storage needs. As hyperscale data centers grow to accommodate cloud computing, artificial intelligence (AI), machine learning (ML), edge computing, and big-scale analytics, the limitations of traditional air-cooling technologies are evident, particularly in the areas of energy inefficiency and insufficient heat dissipation for high-performance computing (HPC) systems.

The increasing number of collaborations among hyper-scale players and immersion cooling technology companies is yet another sign of industry momentum. Major cloud service providers (CSPs), including Google Cloud, Microsoft Azure, and Amazon Web Services (AWS) are already exploring large-scale deployments and pilot projects of immersion-cooled systems to enhance their energy efficiency and facilitate climate commitments. Immersion Cooling is an attractive alternative option, as it enables servers and other IT hardware components to be directly submerged in thermally conductive dielectric fluids. These fluids are effective at absorbing heat, resulting in dramatic energy consumption reductions and allowing for increased rack densities. Apart from fluid innovation, the transition to modular data center designs also further increases the importance of immersion cooling technologies. Modular solutions tend to need compact, high-efficiency thermal systems, which immersion cooling easily offers. Consequently, it is a growing enabler for edge data centers, micro data centers, and quickly deployable computing units.

Growing Adoption of Cryptocurrency Mining

One of the primary drivers of the strong growth of the global immersion cooling market is the meteoric rise of the cryptocurrency mining sector. With the increasing use of digital currencies

such as Bitcoin and Ethereum as an investment as well as a transaction tool, there is a basic requirement for high-computer machinery, especially mining machinery. The mining activities, especially those industrial scale, produce vast quantities of heat for the constant running of Application-Specific Integrated Circuits (ASICs) and Graphics Processing Units (GPUs).

Conventional air-cooling solutions have been inadequate and progressively expensive in terms of controlling the thermal load of such hardware, particularly in areas with high ambient temperatures. This has encouraged the adoption of Immersion Cooling technologies, which are thermally more efficient, minimize noise, and extend equipment life. By submerging mining equipment in heat-conductive dielectric fluids that enable rapid heat removal and maintain optimal working temperatures, immersion cooling provides a highly efficient solution. In addition to increasing the lifespan and performance of the mining equipment, this also yields substantial energy and operational cost reductions, two highly important factors when it comes to cryptocurrency mining profitability. The benefits of immersion cooling for large mining farms are being increasingly acknowledged as mining operations extend across the globe, especially in North America, Eastern Europe, and certain regions of Asia.

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#### **Regional Outlook**

Strong Presence of Key Market Players in Asia-Pacific

The immense growth of the Asia-Pacific immersion cooling market is directly linked to the increasing usage of high-performance computing and data centers. These are being spearheaded by China, South Korea, and Japan, backed by strong manufacturing infrastructure and well-developed supply chains. The majority of the world's activity within single-phase immersion cooling converges in China, driven by its strategic investments and technological sophistication. According to the People's Republic of China, in January 2025, China accelerated its construction of data infrastructure in 2024. By the end of the third quarter, the total number of data center racks in use exceeded 2.11 million, a year-on-year increase of more than 100.0%. At the same time, two-phase cooling technology is picking up steady momentum, especially in South Korea. Through the end of the decade, China alone should account for an estimated quarter of the global production for immersion-cooled systems, especially those dovetailing Aldriven workloads and edge deployments of computing.

#### North America Holds Major Market Share

The North American immersion cooling market is set to experience significant growth as the demand for energy-efficient cooling solutions increases across industries. Data centers and high-performance computing companies are increasingly turning to immersion cooling to overcome issues related to conventional air and liquid cooling systems. Market development and innovation are being triggered by the need to make cooling systems more efficient and

environmentally friendly. The market is also expanding concerning the use of AI and machine learning solutions, which require advanced cooling techniques. Government policies and efforts promoting energy-efficient products are also fueling market growth in the region. According to the US Department of Energy (DOE), in May 2023, the government announced \$40 million in funding for 15 projects that develop high-performance, energy-efficient cooling solutions for data centers. Used to house computers, storage systems, and computing infrastructure, data centers account for approximately 2.0% of the total US electricity consumption, while data center cooling can account for up to 40.0% of data center energy usage overall. The selected projects—located at national labs, universities, and businesses—seek to reduce the energy necessary to cool data centers. These efforts will lower the operational carbon footprint associated with powering and cooling this critical infrastructure and support President Biden's goals to reach net-zero carbon by 2050.

Market Segmentation and Growth Areas

Single-Phase Segment is Expected to Dominate the Market, Holding the Largest Share

The immersion cooling market is growing immensely, particularly with the use of single-phase implementation. This system is efficient in thermal management while reducing energy consumption in high-performance computing. This method is being preferred by the industry owing to its being more convenient and maintenance-friendly. It also helps to extend hardware life by minimizing thermal stress. Data centers gain greatly by way of lowered operational expenses. Additionally, sustainability is emerging as a priority, and technology has grown increasingly important. The market is likely to grow further as more companies acknowledge its benefits.

High-performance Computing Segment is Expected to Capture a Significant Share of the Market

The increasing demand for higher and more efficient computing is expanding at a rapid pace in all sectors. Immersion cooling is a real alternative option, offering better thermal management for high-performance systems. Compared to traditional air cooling, it allows servers to operate at higher densities without overheating. Organizations are implementing it to maximize energy efficiency and minimize operational expenses. This change is particularly evident in industries such as finance, research, and defense. Immersion cooling also prolongs hardware life by reducing thermal stress. As performance demands keep growing, its acceptance will only go faster. The prospects of this technology are bright as the computing demands change.

## Market Limitations and Challenges

•Technical Complexity & Skill Gap: Specialists with advanced technical expertise are required to install and maintain immersion cooling systems. A lack of workers with knowledge in fluid dynamics, heat management, and dielectric material handling can prove operationally risky for organizations.

•High Initial Investments: Compared to conventional air-cooling technologies, the installation of immersion cooling systems involves a significant initial capital investment. Specialist infrastructure, system integration, and dielectric fluid costs can prove to be the biggest challenges for small and medium-sized enterprises (SMEs).

### Market Players Outlook

The major companies operating in the global immersion cooling market include 3M Co., Green Revolution Cooling Inc. (GRC), Fujitsu Ltd, LiquidStack, and Siemens AG, among others. Market players are leveraging partnerships, collaborations, mergers, and acquisition strategies for business expansion and innovative product development to maintain their market positioning.

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## **Recent Developments**

•In March 2025, The Chemours Co., in providing innovative performance chemistry, recently announced the initiation of a full-scale product test with NTT DATA and regional engineering company, Hibiya Engineering, Ltd., for data center two-phase immersion cooling. The test, which follows successful lab tests, will change the course of data center cooling practices using cutting-edge technologies, including Chemours' innovative dielectric fluid, Opteon 2P50. This announcement marks an important step in the product commercialization process, which includes lab trials, field trials, equipment specification, customer selection, and ultimately, commercial contracts and sales.

•In December 2024, Refroid Technologies Pvt. Ltd. (Refroid), a trailblazer in advanced industrial and comfort cooling technologies, introduced India's first indigenously developed single-phase Liquid Immersion Cooling Solutions. This groundbreaking innovation positions Refroid in the vanguard of eco-friendly data center innovations and addresses the pressing demand for powersaving cooling in an era of unprecedented data growth.

•In November 2024, Nippon Chemi-Con has been working to improve the functionality of aluminum electrolytic capacitors used in servers to contribute to the high performance of expanding IT infrastructure. The company has recently succeeded in developing the industry's first products compatible with Liquid Immersion Cooling (LIC), a highly efficient server cooling method, and has started to provide samples. On the other hand, it has been confirmed that immersion of conventional aluminum electrolytic capacitors accelerates the deterioration of the sealing rubber and shortens their operating life due to airtightness failures. Aluminum electrolytic capacitors on servers, from primary-side smoothing to final-stage CPU/GPU drives, and must be immersion-compatible.

•In October 2024, Hong Kong University of Science and Technology (HKUST) launched the city's largest Liquid Immersion Cooling system in its new research computing facility. This new technology has more than an 80.0% decrease in energy used for cooling and provides an optimal operating environment to improve computing performance at a reduced temperature.

•In June 2024, Asperitas introduced Direct Forced Convection Immersion Cooling, an immersion cooling technology that can facilitate scale, power, and reliability for multiple workloads, such as HPC and AI. The technology provides high performance within the immersion cooling sector, facilitating scale-up and cooling capability over 3.6kW per U. It facilitates precision cooling of high-power-density components with low power overhead, which enables data centers to pack denser servers in a smaller footprint without overheating.

•In March 2024, Marathon Digital Holdings, Inc., a public company that is a bitcoin miner and facilitates and secures the bitcoin ecosystem, announced MARA 2PIC700, an innovative-edge two-phase immersion cooling system designed to revolutionize data center operations with record-setting power, density, and efficiency. Compared to current alternatives, MARA 2PIC700 enables two to four times the power density and can reduce the space requirements for a data center by up to 75.0%. It can operate in temperatures ranging from minus 20 degrees Celsius to 50 degrees Celsius and is built for remote management.

Some of the Key Companies in the Immersion Cooling Market Include-

- 3M Company
- Alfa Laval
- Alibaba Group Holding Ltd.
- Allied Control Ltd.
- Asetek
- Asperitas
- Coolit Systems
- Dcx The Liquid Cooling Co.
- Dug Technology
- Engineered Fluids
- Exascaler Inc.
- Exxon Mobil
- Fujitsu Ltd.
- Green Revolution Cooling Inc. (GRC)
- Horizon Computing Solutions
- Hypertec Group
- Iceotope Technologies Ltd.
- Intel Corp.
- Liquidcool Solutions
- Liquidstack
- Microsoft Corp.

- Midas Green Technologies LLC
- Nortek Air Solutions, LLC
- Rittal GmbH & Co. KG
- Schneider Electric SE
- Siemens AG
- Stulz GmbH
- Submer Technologies
- Vertiv Group Corp.
- Wiwynn Corp.
- Zutacore

Immersion Cooling Market Segmentation Analysis

Global Immersion Cooling Market by Product

- Single-phase
- Two-phase

Global Immersion Cooling Market by Application

- High-performance Computing
- Edge Computing
- Cryptocurrency Mining
- Artificial Intelligence
- Others

Global Immersion Cooling Market by Cooling Liquid

- Mineral Oil (Hydrocarbons & Synthetically manufactured)
- Fluorocarbon-based Fluids (inc synthetic)
- Deionoized Water
- Others

**Regional Analysis** 

- North America
- o United States
- o Canada
- Europe
- o UK
- o Germany
- o Italy
- o Spain
- o France
- o Rest of Europe
- Asia-Pacific
- o China

- o India
- o Japan
- o South Korea
- o ASEAN Economies (Singapore, Thailand, Vietnam, Indonesia, and Other)
- o Australia and New Zealand
- o Rest of Asia-Pacific
- Rest of the World
- o Latin America
- o Middle East and Africa

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