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Global data center liquid cooling market - 2025 -2032

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Abstracts

Market Overview

Global Data Center liquid Cooling Market reached US$ 2.80 billion in 2024 and is expected to reach US$ 13.05 billion by 2032, growing with a CAGR of 21.21% during the forecast period 2025-2032.

The global data center liquid cooling market is experiencing significant growth, driven by the increasing demand for energy-efficient and sustainable cooling solutions in high-performance computing environments. Liquid cooling systems offer superior thermal management compared to traditional air cooling, enabling higher server densities and improved energy efficiency. This technology is particularly beneficial for data centers handling intensive workloads such as artificial intelligence and big data analytics. Companies are investing in liquid cooling to meet environmental regulations and reduce operational costs. The adoption of liquid cooling is also facilitated by advancements in cooling technologies and the growing emphasis on green data center initiatives.

Market Trend

The global data center liquid cooling market is shifting rapidly toward immersion and direct-to-chip cooling technologies as hyperscale and AI workloads demand higher thermal efficiency. For example, Microsoft has deployed two-phase immersion cooling in Azure data centers, achieving up to 15% more energy efficiency, while Nvidia is integrating liquid cooling into its next-gen GB200 servers powered by Blackwell chips to manage AI-driven heat loads. Super Micro has already delivered over 1,000 liquid-cooled AI racks, showing early large-scale adoption. Additionally, Centuria Capital is backing edge data centers in Australia with full liquid immersion cooling to reduce power usage and environmental impact.

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Market Dynamics

Increasing AI and HPC Workloads Requiring High-Density Cooling Solutions

The global data center liquid cooling market is experiencing rapid growth, driven by the escalating demands of high-performance computing (HPC), artificial intelligence (AI), and sustainability initiatives. A significant trend is the increasing adoption of liquid cooling solutions by major tech companies to enhance energy efficiency and manage the heat generated by advanced computing workloads.

Additionally, Nvidia is pioneering liquid cooling solutions for its next-generation GB200 server racks, aiming to address the soaring energy demands of AI-focused data centers. These initiatives reflect a broader industry shift towards sustainable and efficient cooling technologies to support the growing computational needs.

Complexity and Cost of Retrofitting Existing Air-Cooled Data Centers

Retrofitting existing air-cooled data centers to accommodate liquid cooling presents significant challenges due to the complexity and high costs involved. Modifying infrastructure to support liquid cooling systems requires substantial investment in new equipment and specialized installation processes.

For instance, the installation of coolant distribution units (CDUs) and integration with existing plumbing systems can be both technically demanding and expensive. Additionally, the need for specialized maintenance and the potential for system leaks further complicate the retrofitting process, making it a less attractive option for many data center operators.

Segment Analysis

The global data center liquid cooling market is segmented based on type, data center, cooling technique, application and region.

Single-Phase Liquid Cooling Drives Growth in the Global Data Center Cooling Market

The single-phase liquid cooling segment is significantly propelling the due to its efficiency and adaptability. In 2024, this segment accounted for over 55.4% of the data center liquid immersion cooling market, reflecting its widespread adoption. This cooling method involves submerging IT equipment in a dielectric fluid, facilitating effective heat

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dissipation without the complexities associated with phase change. Companies favor single-phase immersion cooling for its simplicity and ability to handle high-density workloads with ease.

Thesingle-phase segment method's efficiency in managing heat dissipation is crucial as data centers increasingly handle high-density workloads. The adoption of single-phase liquid cooling is also driven by its compatibility with existing infrastructure, reducing the need for extensive retrofitting. As data centers expand to meet the growing demands of AI and cloud computing, single-phase liquid cooling offers a scalable and effective solution to address thermal management challenges.

Data Center liquid Cooling Market Geographical Share

North America Drives the Global Data Center Liquid Cooling Market

The demand for data center liquid cooling in North America is significantly influenced by the rapid expansion of AI-driven data centers and the increasing need for energy-efficient cooling solutions. In 2023, data centers in the US consumed approximately 4.4% of the nation's electricity, with projections indicating that this share could rise to between 6.7% and 12% by 2028. This surge in energy consumption is primarily driven by the growing computational demands of AI applications, necessitating advanced cooling technologies to manage the excess heat generated.

To address these challenges, companies are adopting liquid cooling systems, which offer higher thermal efficiency compared to traditional air-cooling methods. For instance, Ohio-based Vertiv Holdings, a provider of power and cooling systems, has experienced a nearly 700% increase in its stock price since the end of 2022, reflecting the heightened demand for efficient cooling solutions. These developments underscore the critical role of liquid cooling technologies in supporting the sustainable growth of data centers in North America.

Sustainability Analysis

The global data center industry is experiencing a significant shift towards liquid cooling technologies, driven by the need for enhanced energy efficiency and reduced environmental impact. Traditional air-cooling methods are increasingly inadequate for managing the heat generated by high-density computing workloads, leading to higher energy consumption and operational costs. In response, companies are adopting liquid cooling solutions, which offer superior thermal management capabilities.

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For instance, the US Department of Energy (DOE) has recognized the importance of efficient cooling systems, noting that cooling can account for up to 40% of a data center's total energy usage. To address this, the DOE announced US$ 40 million in funding for 15 projects aimed at developing high-performance, energy-efficient cooling solutions for data centers, emphasizing the critical role of liquid cooling in achieving sustainability goals.

Moreover, leading technology companies are actively exploring and implementing liquid cooling technologies to enhance sustainability. Microsoft, for example, conducted a comprehensive life cycle assessment comparing various cooling methods and found that transitioning from air cooling to cold plate liquid cooling could reduce greenhouse gas emissions and energy demand by approximately 15%, and water consumption by 30% to 50% across the data centers' entire life spans.

Major Players

The major global players in the market include Schneider Electric SE, Vertiv Group Corporation, Asetek A/S, LiquidStack Inc., Submer Technologies SL, CoolIT Systems Inc., Midas Green Technologies LLC, Iceotope Technologies Limited, Chilldyne Inc., and Asperitas BV.

Key Developments

> In June 2025, Shell expanded into direct cooling The company unveiled Shell DLC Fluid S3, a direct liquid cooling (DLC) solution to handle heat from high-performance computing and AI workloads. Efficiency and longevity combined Shell claims up to 27% improvement in power usage effectiveness (PUE), with corrosion protection and over six years of expected fluid service life.
>
> In January 2024, Data center firm Aligned launched a new liquid cooling system, called DeltaFlow~, the liquid cooling technology is designed to support high-density compute requirements and supercomputers, and can cool densities up to 300kW per rack. DeltaFlow~ is described as a turnkey solution supporting current and future liquid cooling technologies, including direct-to-chip, rear-door heat exchangers, and immersion cooling.

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