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Data Center Liquid Cooling Fluids Market by Fluid Type (Water Glycol Mixtures, Synthetic Hydrocarbons, Fluorocarbon-Based Fluids), Cooling Method (Single Phase, Two Phase), Data Center Type, Cooling Technology, and Region - Global Forecast to 2032

https://marketpublishers.com/r/DFC8BDDAD94AEN.html
Date: February 2026
Pages: 309
Price: US$ 4,950.00 (Single User License)
ID: DFC8BDDAD94AEN

Abstracts

The data center liquid cooling fluids market is projected to grow from USD 0.28 billion in 2025 to USD 2.01 billion in 2032, at a CAGR of 32.7% during the forecast period. The significant increase in computing density driven by cloud computing, artificial intelligence, and high-performance applications is the primary factor propelling the data center liquid-cooling fluids market. This increase is beyond the capacity of conventional air cooling to handle. Modern data centers use high-performance GPUs, accelerators, and processors that generate concentrated heat at the chip and rack levels. This leads to heat problems that air-based systems cannot manage. Better heat transfer is provided by liquid cooling fluids, which enable direct heat removal from vital components. Even with extremely high-power densities, this helps maintain steady operating temperatures. The demand for improved space utilization, lower energy consumption, and greater operational reliability is another factor driving the move toward high-density computing.

“By data center type, the hyperscale segment is estimated to hold the largest share, in terms of volume, during the forecast period.”

The hyperscale segment is estimated to hold the largest share in terms of volume of the data center liquid cooling fluids market during the forecast period, as hyperscale data centers operate at high computing power and experience rapid facility growth. Hyperscale operators build massive facilities that global cloud and technology providers use to deliver cloud services while supporting artificial intelligence, machine learning,

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and high-performance computing workloads that generate continuous, extreme heat. Data centers need liquid-cooling solutions because they operate at very high server counts while rack power densities continue to rise. The design of hyperscale facilities includes long-term scalability features, leading to greater total cooling fluid consumption than in colocation or enterprise data centers. Hyperscale also adopts liquid cooling earlier and on a larger scale to achieve lower energy consumption, improved power usage effectiveness, and reduced operational costs. The combination of large physical footprints, dense compute deployments, and standardized liquid-cooling architectures results in significantly higher volumes of cooling fluids used over the lifecycle of hyperscale data centers, driving their dominance in market volume.

“By cooling technology, the direct-to-chip cooling fluids segment is estimated to hold the largest share, in terms of volume, during the forecast period.”

The direct-to-chip cooling fluids segment is estimated to hold the largest share in terms of volume during the forecast period, as it is the most effective and scalable method for controlling the increasing heat generated by processors in contemporary data centers. A direct-to-chip cooling system provides effective heat dissipation at the CPU and GPU, eliminating the need for complete system immersion, as AI, high-performance computing, and cloud workloads increase power requirements. The approach enables server operators to use liquid cooling in both newly constructed and existing facilities that undergo equipment updates, as it works with their current server systems. Direct-to-chip systems must maintain constant cooling fluid flow across multiple processors, resulting in higher total fluid consumption than specialized or localized cooling systems. Direct-to-chip cooling provides substantial energy-efficiency improvements while enabling operational flexibility, making it the top choice for hyperscale and colocation operators that use high-density racks. The solution achieves widespread adoption by combining excellent performance with dependable service and simple implementation, thereby creating ongoing demand for cooling fluids.

“By cooling method, the single-phase cooling segment is estimated to hold the largest share, in terms of volume, during the forecast period.”

The single-phase cooling segment is expected to hold the largest share, as it is the most established, reliable, and widely used liquid-cooling solution for contemporary data centers. The design of single-phase systems is easier to manage and maintain because their liquid coolants maintain a constant physical state throughout the cooling process, thereby improving operational efficiency compared to two-phase systems. The operational dependability and system understanding of single-phase cooling create a

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strong preference for this technology among hyperscale data centers, colocation facilities, and large-scale enterprise data centers that implement liquid-cooling systems. The implementation of single-phase cooling enables seamless operation with direct-to-chip and cold plate systems, which have become standard solutions for managing increased CPU and GPU thermal output. The systems require constant liquid flow through their multiple servers and racks, leading to increased total cooling fluid consumption. The existing cooling systems and water loops can be integrated with single-phase cooling systems, delivering operational advantages that make deployment safer and more affordable, thereby driving increased usage and establishing single-phase cooling as the market leader during the forecast period.

“By fluid type, the water glycol mixtures segment is estimated to hold the largest share, in terms of volume, during the forecast period.”

The water-glycol mixtures segment is estimated to hold the largest share, in terms of volume, during the forecast period because it delivers optimal thermal performance and cost efficiency, as well as dependable cooling performance for data center cooling systems. Water-based coolants deliver exceptional heat transfer performance, which glycol addition enhances by providing freeze protection, corrosion resistance, and system durability for use in various climate and operational environments. Water-glycol mixtures serve as the primary coolant for direct-to-chip and single-phase cooling systems, which are the most widely used liquid-cooling systems in hyperscale, colocation, and enterprise data centers. The system enables large-scale implementation by connecting to existing chilled water systems and heat exchanger infrastructure, requiring no major changes to current systems. Data center operators prefer water-glycol mixtures because they are inexpensive and easy to maintain, unlike specialized dielectric fluids, which require specialized handling. The combination of their performance, flexibility, and economic benefits provides the basis for their success in maintaining market share during the forecast period.

Profile break-up of primary participants for the report:

By Company Type: Tier 1 – 45%, Tier 2 – 22%, and Tier 3 – 33%

By Designation: C-Level Executives– 50%, Directors– 10%, and Others – 40%

By Region: North America – 17%, Asia Pacific – 17%, Europe – 33%, Middle East & Africa – 25%, and South America – 8%

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Shell plc (UK), The Chemours Company (US), Dow Inc. (US), Valvoline Global Operations (US), Exxon Mobil Corporation (US), and others are the key players in the data center liquid cooling fluids market. These players have adopted various strategies, including agreements, joint ventures, and expansions, to increase their market share and business revenue.

Research Coverage:

The report defines segments and projects the size of the data center liquid cooling fluids market based on fluid type, data center type, cooling technology, cooling method, and region. It strategically profiles the key players and comprehensively analyzes their market share and core competencies. It also tracks and analyzes competitive developments, such as expansions, agreements, and acquisitions undertaken by them in the market.

Reasons to Buy the Report:

The report is expected to help market leaders/new entrants by providing the closest approximations of revenue for the data center liquid cooling fluids market and its segments. This report is also expected to help stakeholders gain a deeper understanding of the market's competitive landscape, acquire valuable insights to enhance their business positions, and develop effective go-to-market strategies. It also enables stakeholders to understand the market's pulse and provides information on key market drivers, restraints, challenges, and opportunities.

The report provides insights into the following pointers:

Analysis of critical drivers (Growth in data center market, Rise in use of liquid cooling technology in data centers boosts demand for Liquid cooling fluids, and Increase in server rack density), restraints (Technology under development for two-phase PFAS-free fluids for immersion cooling, Lack of widely accepted industry standards, and High initial investment cost), opportunities (Growing installation of AI-based mega data centers, Growing demand for energy efficient cooling solutions, Data center owners and operators face growing pressure to lower carbon footprint, Increasing demand for environment friendly fluid technology, such as PFAS free and bio-based fluids, and Growth in DTC liquid cooling technology) and challenges (Fluid contamination risk increases maintenance burden, and Maintenance challenges and cost burden in immersion cooling for data centers) influencing the growth of the data center

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liquid cooling fluids market

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities in the data center liquid cooling fluids market

Market Development: Comprehensive information about lucrative markets – the report analyzes the data center liquid cooling fluids market across varied regions

Market Diversification: Exhaustive information about new products, various types, untapped geographies, recent developments, and investments in the data center liquid cooling fluids market.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and product offerings of leading players such as Shell plc (UK), The Chemours Company (US), Dow Inc. (US), Valvoline Global Operations (US), and Exxon Mobil Corporation (US), and others are the key players in the data center liquid cooling fluids market.

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