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Data Center Cooling Designs Market - Global and Regional Analysis: Focus on Current Design Standards and Future Design Standards

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Abstracts

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This report will be delivered in 7-10 working days.Introduction to the Global Data Center Cooling Designs Market (Including Market in 2024 and 2035)

The Global Data Center Cooling Designs Market is positioned for robust growth, driven by the escalating demands of hyperscale, colocation, and edge data centers. In 2024, most operators still rely on established air-based systems—such as hot/cold aisle containment and chilled-water cooling—to accommodate higher rack densities. However, intensifying pressures to reduce energy consumption and mitigate environmental impact are accelerating the adoption of more advanced designs.

By 2035, liquid-based cooling solutions (immersion, direct-to-chip, and hybrid methods) are set to occupy a larger share of the market. As data centers aim to achieve carbon-neutral or low-power usage effectiveness (PUE) footprints, advanced cooling architectures that handle increasingly dense servers and meet global sustainability guidelines will dominate. This evolution will be propelled by industry-wide collaborations among component manufacturers, data center operators, and technology vendors, culminating in next-generation cooling designs that optimize both performance and total cost of ownership.

Regional Analysis

• North America: The U.S. leads in hyperscale developments, with major cloud

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providers experimenting with immersion cooling, direct liquid cooling, and advanced airflow containment. Canada and Mexico follow suit, adopting proven cooling strategies to meet regional climate constraints and rising energy costs.

• Europe: Stringent sustainability targets and high electricity prices drive the region's shift toward eco-friendly designs. Countries like Germany, the U.K., and the Netherlands spearhead adiabatic and evaporative cooling innovations, while also embracing retrofitting initiatives for older data centers.

• Asia-Pacific: Rapid digitalization in China, Japan, South Korea, Australia, and India fosters new data center projects, many of which are constructed with the latest cooling technologies from inception. Government initiatives encouraging energy efficiency stimulate growth in advanced liquid-cooling methods.

• Rest-of-the-World: Latin America, the Middle East, and Africa expand their data center footprints by adopting cost-effective solutions such as indirect free cooling. International providers often partner with local firms to introduce cutting-edge systems where climate and economic factors permit.

Segments in the Global Data Center Cooling Designs Market

• By Application

o Hyperscale Data Centers

Capacity trends (2022-2030), cooling strategies of top operators (Google, Microsoft, AWS, Meta, Apple)

o Colocation and Retail Data Centers

Cooling approaches of key players (Digital Realty, Equinix, CyrusOne, NTT Communications, Telehouse)

o Others

• Adoption Based on Data Center Age

• By Product (Design Type)

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o Air-Based Cooling Designs

Ongoing: Hot/Cold Aisle Containment, Chilled Water Air Cooling, Direct Expansion (DX) Cooling

Upcoming: Indirect Evaporative Cooling (IDEC), Direct Evaporative Cooling (DEC), Adiabatic Cooling

o Liquid-Based Cooling Designs

Ongoing: Direct-to-Chip Liquid Cooling, Single-Phase Immersion Cooling

Upcoming: Hybrid Liquid Cooling, Liquid-to-Liquid Heat Exchangers

Key Players of the Market

• IMI Hydronic

• Danfoss

• SPX Cooling Technologies

• Boyd

• Victaulic

• Wattco

• BOWMAN

• Staubli

• DraCool

• Heatex

• Kelvion

• Thermal Care

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• Wieland MicroCool

• TCF Azen

• Amstrong Fluid Technologies

Trend in the Market

A prominent trend is the adoption of liquid-based cooling as servers grow denser. Operators are exploring direct-to-chip and immersion cooling systems to reduce energy consumption and accommodate high-performance computing (HPC) clusters, AI workloads, and advanced 5G/6G infrastructures. These technologies often deliver better temperature control and lower PUE, making them attractive for both new and retrofitted facilities.

Driver in the Market

Increasing sustainability requirements and escalating energy costs are significant drivers for the Global Data Center Cooling Designs Market. Data centers consuming vast amounts of power face mounting scrutiny from regulators, investors, and communities. As a result, operators invest in more efficient cooling solutions that conserve water, use greener refrigerants, and leverage lower ambient temperatures—ultimately aiming to minimize carbon footprints and comply with evolving environmental mandates.

Restraint in the Market

Despite innovation, high installation and operational complexities can restrain widespread adoption. Advanced cooling designs, especially liquid-based solutions, demand specialized infrastructure, fluid distribution lines, and skilled personnel. For existing data centers, retrofitting can be expensive and disruptive, creating a dilemma over whether to upgrade incrementally or shift to new greenfield builds better aligned with next-gen cooling architectures.

Opportunity in the Market

Modular and prefabricated cooling solutions present a major opportunity, particularly for edge deployments and smaller data centers in emerging markets. These ready-to-install

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modules, often integrating liquid or hybrid cooling methods, allow rapid scaling and simplified maintenance. With increasing adoption of edge computing for latency-sensitive applications (such as IoT and AI-driven analytics), vendors offering compact, efficient cooling modules stand to capitalize on diverse deployment scenarios.

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6. RESEARCH METHODOLOGY

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