

Monday, June 8, 2026

Glycol in Data Centers

Monday Morning Minutes | by R. L. Deppmann

In our previous article, we focused on glycol for direct liquid chip cooling. In this second installment of our four-part R.L. Deppmann Monday Morning Minute series on glycol in data centers, we'll zoom out and look at how glycol is used across data centers, from liquid-cooled systems to more traditional cooling loops.



Glycol's Role in Modern Data Cooling

Glycol has become an essential component in modern data center cooling systems, playing one of the most important roles in maintaining stable temperatures for mission-critical hardware. As data centers continue to grow in density, traditional air cooling alone just isn't enough to provide efficient support.

Glycol-Based Coolant Loops Offer Several Key Advantages:

- Highly Efficient Heat Transfer Away from Servers
- More Consistent Operating Temperatures
- Reduced Risk of Unplanned Building Shutdowns



Temperature Stability in Extreme Operating Conditions

One of the biggest advantages of glycol is its ability to remain stable and functional in a variety of temperatures. Unlike water, glycol mixtures resist freezing and boiling, making them ideal for facilities in extreme climates or environments where cooling systems operate in below freezing temps.

For example, propylene glycol-based heat transfer fluids can provide freeze protection well below 0°C depending on concentration, with typical solutions offering protection to temperatures as low as -40°C or lower in properly formulated systems.

These fluids are also designed to operate across a broad temperature range, with recommended use conditions extending from sub-zero environments up to approximately 160°C (320°F), making them suitable for both cooling and heat rejection applications within the same system.

This Temperature Stability Helps Ensure:

- Continuous System Uptime
- Reliable Cooling in Cold-Weather Environments
- Support for Mission-Critical Operations

This stability helps ensure continuous uptime, a core requirement for data centers supporting cloud computing, AI workloads, financial services, and other industries that demand around-the-clock reliability.

In large-scale deployments, glycol-based fluids are already used in direct-to-chip and facility cooling systems supporting multiple gigawatts of global data center capacity, demonstrating their reliability in high-demand environments.

Supporting Scalable and Energy-Efficient Cooling Designs

Glycol enables more flexible and energy-efficient system cooling designs. Closed-loop systems using glycol can be incorporated with chillers, heat exchangers, and liquid-to-air cooling units. This is a key factor in creating a design that can scale with the data center's growth.

Since glycol systems are typically implemented in closed-loop configurations, they help minimize fluid loss, reduce contamination risk, and allow for more controlled thermal management across the entire cooling infrastructure.

Glycol's corrosion inhibitor packages are designed to protect critical system components as well — such as pumps, piping, and heat exchangers — helping maintain system efficiency and reduce long-term maintenance requirements.

By Improving Overall Thermal Transfer Efficiency, Glycol Helps:

- Reduce Operational Costs
- Improve Thermal Transfer Efficiency
- Support Long-Term Sustainability Goals

By improving the overall thermal transfer efficiency, glycol helps reduce operational costs and supports sustainability goals. That's something today's data center operators prioritize more than most else.

Compared to untreated water systems, inhibited glycol-based fluids can reduce maintenance requirements by eliminating the need for frequent chemical treatment and lowering the risk of biological growth or system fouling, both of which can negatively impact heat transfer performance over time.

With a broader view of glycol's role in data centers, the next article will focus on glycol used in climate control systems and cooling towers.