



DOW[®]

Compatibility and Risks of Mixing DOWFROST™ LC 25 with Other PG25 Coolants

Can DOWFROST™ LC 25 be Mixed with Other PG25 Coolants?

Inhibited propylene glycol-based coolants such as DOWFROST™ LC 25 Heat Transfer Fluid (a PG25 coolant) are commonly used in data center liquid-cooled systems due to their enhanced corrosion protection, thermal performance and bio-static nature. While customers may pursue multi-sourcing strategies to enhance supply chain resiliency, this approach introduces critical risks when applied to PG25 coolants.

Mixing DOWFROST™ LC 25 with other PG25 coolants is generally not recommended for several reasons. Each PG25 coolant, such as DOWFROST™ LC 25, contains a proprietary blend of corrosion inhibitors and stabilizers, making it difficult to achieve complete interoperability while maintaining system reliability and serviceability.

Quality and Compatibility Concerns

Companies offering products advertised to be similar to DOWFROST™ LC 25 may have very different quality standards, inhibitor chemistries and additive packages. Combining these can cause unintended interactions leading to unpredictable performance and potential system issues. This can result in unknown or reduced corrosion protection for cold plates, pumps, manifolds and piping.

Dow operates under the highest standards of product purity, consistency and performance. DOWFROST™ LC 25 is formulated with carefully balanced inhibitors and additives to deliver reliable corrosion protection and long fluid life. Mixing with alternative PG25 coolants with unknown inhibitor chemistries, additive packages and quality standards can lead to unintended chemical interactions, unpredictable performance and potential system issues.

Inline Monitoring, Fluid Analysis and Remediation Challenges

Routine analytical testing should be conducted on DOWFROST™ LC 25 to assess the overall health during operation. Based on these results, Dow will issue a report indicating if the fluid is suitable for continued use or if fluid modification are needed to restore it to specification. Dow's guidelines are tailored specifically to DOWFROST™ LC 25. When PG25 coolants are mixed, these guidelines no longer apply, making it difficult to provide adequate remediation recommendations.

Additionally, many users will utilize other monitoring techniques to ensure product health. This includes inline sensors – such as pH, refractive index, conductivity, and turbidity – which rely on stable and well-characterized fluid thresholds to trigger alarms and ensure safe operation. Mixing coolants can affect these properties, potentially masking early signs of corrosion or contamination and complicating maintenance compliance. This also makes effective dosing and remediation significantly more problematic by complicating sensor interpretation and maintenance protocols and rendering inline monitoring unreliable.

What if the System Previously Contained Another Coolant?



Although mixing of DOWFROST™ LC 25 with an alternative PG25 coolant is not recommended, Dow recognizes that it may be unavoidable in certain situations. This could include unexpected events (e.g. leaks) where DOWFROST™ LC 25 is not available on-site due to improper planning and action needs to be taken quickly to top-off the lost fluid. In this case, the consequences of a potential system shutdown, and thus down-time, may be greater than the effect of a small volume of a non-Dow PG25 coolant would have on the system. Another unavoidable scenario may include commissioning of equipment (e.g. racks, CDUs) that are pre-filled with an alternate PG25 coolant off-site and complete removal is not possible, due to system design constraints, before filling with DOWFROST™ LC 25.

As part of Dow's evaluation of fluid compatibility and performance, testing was conducted following introduction a commercially available organic acid technology [VS1] (OAT) based PG25 coolant with fresh, previously unused, DOWFROST™ LC 25. The objective was to assess whether the mixture exhibited initial compatibility and met Dow's specifications for acceptable fluid parameters, including pH, reserve alkalinity, inhibitor levels, contaminants, turbidity and stability.

Testing showed that a 5% introduction of an alternative PG25 coolant into DOWFROST™ LC 25 did not adversely impact key fluid parameters, as all measured values remained within Dow's specification limits for new fluid. However, while initial compatibility was confirmed, long-term performance remains the true indicator of acceptability. Aging studies are essential to ensure sustained inhibitor performance, corrosion protection and fluid stability over time.

Whatever the case may be, Dow does not anticipate catastrophic failure if <5% of the total system volume of an alternative PG25 coolant is introduced into a DOWFROST™ LC 25 system, assuming there are no silicate-based additives. However, it is always best practice to document when these additions take place and consult Dow for specific guidance as additional testing may be required.

Table 1: Properties of New DOWFROST™ LC 25 and Blended PG25

	Typical Properties of New DOWFROST™ LC 25 Heat Transfer Fluid	Properties of DOWFROST™ LC 25 when mixed with 5% OAT-based PG25
Fluid pH	9.2	9.1
Refractive Index, 25°C	1.3636	1.3636
Reserve Alkalinity, mL	7.2	7.0
Corrosion Inhibitors	Proprietary	2-5% reduction in inhibitor levels
Color	Fluorescent yellow 	Fluorescent yellow 
Precipitate	None detected	None detected
Turbidity	<5 NTU	<5 NTU

PG25 Coolant Industry Claims

When evaluating the compatibility of two differing PG25 coolants, it is critical to go beyond short-term or limited testing methodologies. While some manufacturers may claim full compatibility with established products such as DOWFROST™ LC 25 Heat Transfer Fluid, these statements are often based solely on glassware corrosion tests or other short-duration evaluations. Such tests, while useful for initial screening, do not adequately simulate the long-term chemical interactions, material compatibility or thermal stability required for reliable performance over the operational life of the fluid. To ensure true compatibility, a comprehensive testing protocol should include extended duration corrosion testing, thermal aging studies, additive interaction analysis, deposit formation and fouling assessments and pilot-scale testing, as an example. Without this level of rigor, compatibility claims may overlook subtle but critical issues that emerge only after months or years of operation, potentially leading to corrosion, fouling or reduced thermal efficiency. Therefore, any coolant substitution or mixing should be approached with caution and validated through robust, long-term testing protocols.

Why Choose Dow and DOWFROST™ LC 25?

As a recognized leader in the heat transfer fluid industry, Dow has produced robust glycol-based heat transfer fluids for over 60 years. Dow is also the world's leading producer of propylene glycol, enabling direct and reliable access to propylene glycol feedstock (PG USP/EP with >99.8% purity) with consistent quality control across all production stages and reduced dependency on third-party suppliers. This backward integration positions Dow to consistently deliver the volumes needed for hyperscale data center deployments, where volume assurance and delivery reliability are critical. Dow's scale and readiness to support data center infrastructure growth make Dow a trusted technical partner, not just a supplier.

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