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INDUSTRIAL WATER TREATMENT

COMPLETE TREATMENT SERVICES
FOR ALL HEATING & COOLING
WATER CIRCUITS

Product Information

PROPYLENE AND ETHYLENE GLYCOL (inhibited with DiPotassium phosphate)

Burst Protection vs. Freeze Protection

When selecting the proper concentration of glycol to be used in a heat transfer system, there are two basic types of protection to consider: burst protection and freeze protection. What's the difference?

Burst Protection

Burst protection is required if the system will sit dormant at temperatures below the freezing point of the fluid, putting the pipes in danger of bursting. For these situations, the system needs enough glycol to keep the fluid from freezing solid. A slushy mixture is acceptable, since the fluid will not be pumped through the system. Trying to pump fluid containing ice crystals can result in damage to system components. Since the mixture expands as it freezes, there must be enough volume available in the system to accommodate the expansion.

Inhibited glycol-based heat transfer fluids provide burst protection in the following manner. As the temperature drops below the solution's freezing point, ice crystals begin to form. Because water in the solution freezes first, the remaining glycol solution becomes further concentrated and remains fluid. The combination of ice crystals and fluid results in a flowable slush. Fluid volume increases as this slush forms, with the extra volume flowing into available expansion volume in the system.

For burst protection, a 30% by volume solution of ethylene glycol or 35% by volume solution of propylene glycol is usually adequate. Inhibited Glycols are not 100% glycol (water and corrosion inhibitors are also present); therefore, to achieve a 30% or 35% concentration, a slightly higher concentration of these fluids, as a total formulation, is required. See the tables on the following page for concentrations needed for burst protection at various temperatures.

Freeze Protection

Freeze protection is required if a system is going to be pumped at the lowest anticipated temperature. This can include systems that are dormant for much of the winter, but require start up during the cold weather, or systems that would be at risk if the power or pump failed. For these situations, the system must have enough glycol present to prevent any ice crystals from forming. It generally requires more glycol for freeze protection, keeping the fluid completely liquid, than it does for burst protection, where a slushy mixture is acceptable.

For freeze protection, the required concentration of inhibited glycol fluid in the system depends on the operating conditions of the system and the lowest expected ambient temperature. To obtain adequate freeze protection, the glycol solution must maintain a freezing point at least 5°F below the lowest anticipated temperature.

Recommended Concentrations

Dow recommends a minimum concentration of 25% Inhibited Glycol to provide adequate corrosion protection. Diluting these products to less than 25% glycol may reduce the inhibitor package to a level that is ineffective for corrosion protection. Concentrations less than 20% glycol may be at risk of bacterial contamination. For efficient heat transfer, Dow recommends as maximum concentration of 60%. The actual concentration used should fall between these recommended limits, based on individual system needs for freeze or burst protection, as described above.

Please contact your Hood Chemical representative for further information.