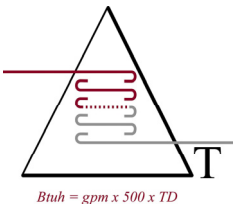

PROTOCOL® NT

HEAT TRANSFER FLUID

Product Description

PROTOCOL NT is an industrially inhibited propylene glycol-based heat transfer fluid. The NT blends are designed for non-toxic service, as well as to provide excellent freeze point depression, burst protection, and corrosion protection in water-based, closed circuit heating and air conditioning systems.

PROTOCOL NT fluids have an operating range from -50°F to 325°F. The fluid contains a blend of organic and inorganic inhibitors specifically formulated to keep mixed metal systems free of corrosion and without fouling critical heat exchange surfaces.

PROTOCOL NT fluid is available as concentrate or premixed with deionized water to meet your exact specification for freeze, burst, and boil protection. It is recommended that PROTOCOL NT heat transfer fluids be purchased premixed with deionized water to ensure optimal corrosion protection and heat transfer efficiency.

PROTOCOL NT blends has little or no negative effect on seals, elastomers, or other construction materials commonly found in HVAC systems. However, we do not recommend its use in systems containing CPVC (chlorinated polyvinyl chloride). Test Data by manufacturers has shown that glycols weaken this material and warn that the use of ethylene or propylene glycol with CPVC could lead to stress cracks and premature failure in a very short period.

Technical Data

Composition, % by weight	
Propylene Glycol	95.4
Inhibitors	4.5
Color	Yellow
Specific Gravity	1.055
pH, 50% solution	9.0 - 9.5
Reserve Alkalinity, 100%	15.0 mls

Physical Properties	
BP @ 760 mm Hg (40%)	219 °F
Flash Point (<90%)	None
VP mm Hg (40% @ 100°F)	44.3
Thermal Conductivity (40% @ 100°F)	0.24
Specific Heat (40% @ 100°F)	0.91
Viscosity, cP (40% @ 100°F)	2.3

Freeze Point (°F)	Volume %	Boiling Point (°F)
26	10	212
19	20	213
15	25	214
9	30	216
2	35	217
- 6	40	219
- 28	50	222

Calculations for Freeze Point Adjustments

If the concentration needs to be increased, use the following:

$$A = V (D - C) / 100 - C$$

Where:
A = Quantity of concentrate to add.
V = Volume capacity of the system.
D = Desired concentration (freeze point).
C = Current concentration.

However, if the concentration needs to be decreased, the following formula should be applied.

$$A = V (D - C) / C$$

Maintaining Optimal Performance

Once the Hydronic system is operational, it is important that you participate in our fluid-testing program. Our Heat Transfer Fluids Laboratory utilizes the most advanced analytical equipment to provide our customers with fast, accurate, and reliable results. The whole concept behind this support program is to ensure that you maximize the service life of your heat transfer fluid and equipment. Approximately 10 days after your glycol sample is received by the laboratory you will receive a detailed report highlighting the results and commenting on any unusual or troublesome (if any) conditions. With PROTOCOL Heat Transfer Fluids and our comprehensive fluid analyses program, you're assured of receiving exceptional quality and value for years to come.

System Preparation

Prior to installing your new heat transfer fluid, it is important that the system be properly cleaned and flushed. Typically, newer systems are coated with oil; grease, dirt or corrosion products and these potential forms of contamination must be removed from the system piping to ensure optimal heat transfer efficiency and corrosion protection. For existing systems, it is equally important that the system is cleaned and flushed especially if the previous fluid contained silicates or was improperly maintained. Cleaners and Degreaser are available from Thermal Fluid Technologies. For more information please contact you local supplier and request our TechSpec™ for PROTOCOL SC-101 and PROTOCOL SD-102.

Expansion Tank

The main function of the expansion tank is to allow for fluid expansion upon heating. A properly designed expansion tank can minimize or eliminate many problems from the initial start-up through everyday operation of the heat transfer system. The expansion tank should be sized so that it is approximately 25% full at ambient temperature and 75% full under normal operating temperatures. This basic design principle should cause sufficient positive fluid pressure on the pump suction side during start-up while minimizing the vapor space in the tank during normal operation. Fluid expansion can be calculated by dividing the fluids density at the lower temperature by the density of the fluid at the highest temperature. Keep in mind that the resulting expansion volume is based on 50% of the total tank volume (difference between 25% and 75%). Therefore, a properly designed expansion tank should be capable of holding twice the expansion volume.

Premixed Solutions

PROTOCOL® heat transfer fluids are available in a wide range of preblended solutions to satisfy your heating and cooling needs. Whenever a preblended version of PROTOCOL is purchased you not only get a ready-to-use product that's been premixed to your exact specifications, but you also get the added benefit of having your product inhibited as if it were a 50/50 mix. Keep in mind that if you purchase concentrate and dilute it down to a 30% solution for example, not only have you diluted the glycol, but you've also diluted the inhibitors down to minimum levels. With a preblended product purchased from Thermal Fluid Technologies, or any of our manufacturing affiliates, you will receive your preblended product inhibited as if it were a 50% blend, regardless of the glycol concentration. This of course is only one aspect of the dilution scenario. Water quality issues as well as the hassles of achieving the required freeze or burst point specification can make field blending difficult, time consuming, and risky practice when considering the cost involved with replacing corroded or ruptured pipes. Due to today's higher construction, labor, and material costs we highly recommend purchasing PROTOCOL heat transfer fluids premixed with deionized water.

PROTOCOL Heat Transfer Fluids
"Performance products of unparalleled quality and value"