Glycols

Freez-Therm

AN ETHYLENE GLYCOL HEAT TRANSFER FLUID AND FREEZE POINT SUPPRESSANT FOR THE HVACR INDUSTRY.

- **Formulated with ethylene glycol for optimum freeze or burst protection**
- **Fully inhibited to prevent corrosion**
- **Specifically formulated for HVACR systems**
- **Effective over broad temperature range**
- **Compatible with most materials**
- **Colored green/yellow for easy leak detection**

Description

Freez-Therm is an inhibited ethylene glycol-based heat transfer fluid and antifreeze for chilled water, hydronic and other closed systems. It is formulated with a fluorescent green/yellow dye for leak detection and product identification and an industrial strength corrosion inhibitor designed specifically for HVACR systems. The corrosion inhibitor protects metals commonly found in both residential and commercial installations, including brass, copper, solder, steel and cast iron. Freez-Therm is a complete heat transfer fluid and freeze point suppressant.

Application

Many commercial and industrial closed water systems are required to operate while being exposed to varying extremes in temperature. And, many times these extremes may approach the freezing point or the boiling point of the water. As a result, use of a heat transfer fluid in order to suppress the freezing point or raise the boiling point becomes a matter of system design.

In these applications, use of the heat transfer fluid will enable the system to operate at the desired operating temperature. In addition, the heat transfer fluid should contain a corrosion inhibitor to protect system metal as those types of systems are invariably troubled with corrosion. Inhibited glycols, ethylene or propylene, are typically the compounds used in these applications.

Typical Systems

- HVAC system freeze/burst protection
- Refrigeration coil defrosting
- Conveyor roller defrosting
- Process heating
- Waste heat recovery
- Solar heating
- Cold room dehumidifying
- Process cooling
- Ice skating rinks
- Sprinkler systems
- Sidewalk snow melting systems
- Refrigeration warehouse floor heating

Corrosion Protection

To achieve adequate corrosion protection from the charge of Freez-Therm, it must comprise a minimum of 33% of the system's volume.

Packaging

1 gallon bottle: **4189-07**
5 gallon pail: **4189-05**
55 gallon drum: **4189-01**

Note: An uninhibited ethylene glycol product is also available in 55 gallon drums, Part Number: **4189-02**

Usage Guidelines

1. Existing Systems: Entire system should be cleaned and flushed. Since Freez-Therm may or may not be compatible with other fluids in the system. We recommend flushing the system completely. It is also important to clean away rust, scale, sediment, etc. from fouled systems.
2. New Systems: These systems may be coated with cutting oils, grease, solder, flux, etc. Therefore, a thorough cleaning of the system is recommended; Use a 1% or 2% solution of trisodium phosphate (TSP), or other recognized low foaming, alkaline detergent cleaner.
3. Identify the level of freeze protection needed. Then, consult Table 1 to identify the percentage (of system volume) that Freez-Therm must comprise to achieve the desired protection. Always use a freeze protection level that is 5ºF below the lowest temperature the system will experience.
4. Identify the system's liquid volume.
5. Multiply the listed percentage times the system volume to arrive at the required gallons of Freez-Therm.
6. Drain the system of sufficient water so that the needed Freez-Therm can be added.
7. Dilution with demineralized or deionized water is strongly recommended, particularly in areas with total hardness values greater than 100 ppm. (See make-up water requirements below)
8. Circulate for 24 hours and check with a glycol refractometer.
9. Burst protection, a level of protection that is sufficient where the system fluid doesn't have to be pumped at the lowest anticipated temperature, can be achieved with 5-14% less Freez-Therm. Consult Nu-Calgon for details.

*Note: Make-up water requirements

The use of good quality deionized or demineralized water for dilution with glycols is imperative in closed-loop systems. In addition, the use of softened water is not recommended, due to the possible presence of anions, such as chlorides or sulfates. The water available from publicly owned water treatment facilities or wells has varying degrees of hardness, with much of it containing elevated levels of hard water ions (calcium and magnesium) than are acceptable for dilution of industrially inhibited glycols. These hard water ions will react with the inhibitors and form a solid precipitate, which removes the glycol's inhibitor from solution and creates a film that will coat the inside surfaces of the heat transfer system. This film will reduce heat transfer efficiency in critical components of the system. In addition, by depleting the inhibitor, hard water can accelerate corrosion and pitting of metal surfaces. Another problem with hard water is that it usually contains high levels of chlorides and sulfates. Chlorides and sulfates can also cause pitting and corrosion of metal surfaces.

To ensure the effectiveness of the inhibitors in glycol-based fluids, we recommend system dilution with deionized or demineralized water if the potential supply water exceeds any of the following limits:

100 ppm total hardness

50 ppm calcium

25 ppm magnesium

25 ppm chloride

25 ppm sulfate

Table 1

Typical freezing and boiling points of various aqueous solution concentrations of Freez-Therm.

Freezing Point Temp. ºF	Freez-Therm % of System Volume	Boiling Point Temp. ºF
32	0.0%	212
30	3.6%	213
20	16.7%	215
15	21.9%	217
10	26.3%	218
0	34.0%	221
-10	40.4%	222
-20	45.6%	224
-25	48.1%	224
-30	50.3%	225
-40	54.4%	226
-50	58.3%	228

Estimating System Water Capacity

- For rectangular tanks or sumps, use the following formula (all measurements in feet):
- Length x width x depth x 7.5 gal/cubic ft.
- For cylindirical tanks or sumps, use the following formula (all measurements in feet):
- 3.14 x (vessel radius)2 x height x 7.5 gal/cubic ft.
- For piping tubing, estimate its volume capacity at 20% of tank/sump volume for every 100 feet of pipe/tube, or use the following table:

COPPER PIPE		STEEL PIPE	
Size	Gal/100	Size	Gal/100
3/8″	0.8	3/8″	1.0
1/2″	1.2	1/2″	1.6
5/8″	1.8	3/4″	2.8
3/4″	2.5	1″	4.6
1″	4.3	1-1½ ″	10.2
1-1½ ″	9.3	2″	17.0
2″	6.07		

Read and understand the product's label and Material Safety Data Sheet ("MSDS") for precautionary and first aid information.

The MSDS is available on the Nu-Calgon website at www.nucalgon.com or is returnable by U.S. Mail upon request.