



DOWFROST™ Heat Transfer Fluid

Engineering Specifications for Closed-Loop HVAC and Refrigeration Systems where Incidental Contact with Food or Drinking Water is Possible

Manufacturer

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General Product Description

DOWFROST™ industrially inhibited propylene glycol-based heat transfer fluid is manufactured by The Dow Chemical Company. Aqueous solutions of DOWFROST fluid are designed to provide freeze/burst and corrosion protection, as well as efficient heat transfer, in water-based, closed-loop heating and air conditioning systems.

DOWFROST fluid has an operating temperature range of -50°F to 250°F; with fluid freeze protection to below -60°F, and system burst protection to below -100°F. The fluid contains corrosion inhibitors that are specially formulated for HVAC systems to keep pipes free of corrosion without fouling. DOWFROST fluid is low in toxicity. Fluid ingredients are generally recognized as safe (GRAS) by the FDA. DOWFROST fluid can be specified for use in new HVAC systems, or as a replacement fluid for use in existing systems where incidental contact with food or drinking water is likely. The fluid is colorless (water-white).

Since the toxicity of heat transfer fluids may be adversely altered in HVAC systems, used fluids should be handled with reasonable care, and not be taken internally.

HVAC System Fluid Specification Closed-loop, water-based systems

1. Fluid Material

The propylene glycol fluid to be used in such a system must meet the following requirements:

1.1 The fluid must be industrially inhibited propylene glycol (phosphate-based).

1.2 The fluid must be easily analyzed for glycol concentration and inhibitor level, and easily reinhibited using inhibitors readily available from the fluid manufacturer.

1.3 If the system contains more than 250 gallons of fluid, annual analysis must be provided free of charge by the fluid manufacturer. Manufacturer must also provide testing guidelines for use by the operator of a smaller system.

1.4 The fluid must pass ASTM D1384 (less than 0.5 mils penetration per year for all system metals).

2. Fluid Installation

Follow these installation procedures:

2.1 Clean new or lightly corroded existing systems with a 1- to-2% solution of trisodium phosphate in water prior to the installation of industrially inhibited propylene glycol fluid.

2.2 Extensively corroded existing systems should be cleaned by an industrial cleaning company and all necessary replacements and repairs should be made.

2.3 Use only good quality water in solution with the propylene glycol fluid. Use water with low levels (less than 25 ppm) of chloride and sulfate, and less than 50 ppm of hard water ions (Ca⁺⁺, Mg⁺⁺). Distilled or deionized water is recommended. If good quality water

is unavailable, purchase pre-diluted solutions of industrially inhibited propylene glycol fluid from the fluid manufacturer, or, if available, from the distributor.

3. System Design Considerations

3.1 Avoid use of automatic water make-up systems to prevent undetected dilution of the propylene glycol and possible contamination of the water system.

4. Technical Data

4.1 DOWFROST Fluid Product Description

Composition, % by weight	
Glycols	95.5
Inhibitors and water	4.5
Color	Colorless
Specific gravity at 60/60°F	1.050-1.060
pH of solution containing 50% glycol	9.5-10.5
Reserve alkalinity, minimum	10.6 ml

4.2 Typical Properties of Aqueous Solutions†

(Glycol percentage by volume)

Physical Property	Temp. °F	30% Glycol Solution	40% Glycol Solution	50% Glycol Solution	60% Glycol Solution
Thermal Conductivity Btu/(hr.·ft. ²)(°F/ft.)	40	0.247	0.225	0.204	0.184
	180	0.279	0.249	0.221	0.195
	250	0.279	0.248	0.219	0.192
Specific Heat Btu/(lb.·°F)	40	0.909	0.872	0.830	0.782
	180	0.961	0.934	0.902	0.864
	250	0.986	0.965	0.937	0.905
Viscosity, centipoise	40	5.75	9.63	14.28	23.65
	180	0.68	0.85	1.08	1.29
	250	0.42	0.52	0.59	0.68
Density (lb./ft. ³)	40	64.67	65.21	65.67	66.05
	180	61.92	62.22	62.45	62.61
	250	59.82	59.99	60.11	60.18

†Typical properties, not to be construed as specifications.

4.3 Freezing and Boiling Points of Aqueous Solutions

Freezing Temperature °F	% Glycol by Volume	Boiling Temperature °F
26	10	212
19	20	213
8	30	216
-7	40	219
-28	50	222
-60	60	225
<-60	70	230
<-60	80	245
<-60	90	270

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