

DESCRIPTION

This high quality, heavy duty heat transfer fluid contains a specially designed package of corrosion inhibitors. It provides an operating temperature range of -46°C to 163°C, freeze protection to -51°C and burst protection to -73°C. Properties such as, high thermal conductivity, high boiling points, low toxicity, non-corrosivity, stability over a wide temperature range, and minimal to no fire hazard make it an optimal choice as a heat transfer fluid when mixed with water.



ENVIRO-FROST 100

INHIBITED PROPYLENE GLYCOL HEAT TRANSFER FLUID

PROPYLÈNE GLYCOL INHIBÉ
FLUIDE DE TRANSFERT DE CHALEUR

CODE: ENV-1450



AVAILABLE IN :

4L, 20L, 205L, 1000L

Do not mix with ethylene glycol heat transfer fluids.

APPLICATIONS

Propylene glycol based fluids can be used anywhere a high quality heat transfer fluid is needed. Common uses include secondary cooling and heating applications, various deicing, defrosting, and dehumidifying applications and freeze and burst protection of pipes.

Specific applications: HVAC systems freeze/burst/corrosion protection, snow melting, conveyor roller defrosting, immersion freezing, waste heat recovery, RV antifreeze, cooling liquid foods, packaging carbonated beverages, line heaters, fermentation cooling, combination heating and cooling systems, computer cooling systems, refrigeration coil defrosting, cold room dehumidifying, process heating and cooling, thermal energy storage systems, air preheating, solar heating, and sidewalk, playing field, and refrigeration warehouse subsurface heating.

SPECIFICATIONS

Properties	Specifications
Appearance	Clear
Specific Gravity @ 20°C	1.048-1.053
Refractive index @ 20°C	1.432-1.436
Reserve Alkalinity	9.8 minimum
pH (50% by volume)	9.0-10.0
Freeze Point	-60°C
Flash point	99°C
Composition (% by weight)	
Propylene Glycol	97.5
Inhibitors	1.75
Water	1.20 (3% max)

ALTERNATE CONCENTRATION

ENVIRO-FROST 50 (code: ENV-1451) is a prediluted solution that is considered ready-to-use for most applications.

ALSO AVAILABLE IN :
4L, 20L, 205L, 1000L



PROGRESSIVE CHEMISTRY 

Safe and effective cleaning products can be made completely cruelty-free. We perform no animal testing and none of our ingredients contain animal products or by-products.

Specially blended for use in our harsh Northern climates.

READILY BIODEGRADABLE 

SYSTEMS PREPARATION BEFORE ADDING ENVIRO-FROST 100

Existing systems: It is important that all lines and materials are cleaned and flushed before addition of ENVIRO-FROST 100.

Specifically if previous fluid is incompatible with inhibited propylene glycol. Any rust, scale, and sediment build-up should be removed from the system. If the previously used fluid contained silicates, then silicate residues should be cleaned from system prior to charging with ENVIRO-FROST 100. Chloride ions (from acid cleaners or previous fluid) can contribute to corrosion and so should be removed. For large systems an industrial cleaning company should be consulted. If corrosion is already evident a cleaning procedure involving an inhibited acid cleaner followed by proper neutralization and phosphatization should be implemented by an experienced company. All traces of cleaning agents must be removed and the system should be thoroughly flushed before charging the system with ENVIRO-FROST 100.

New systems: Thorough flushing of system with a 1-2% solution of trisodium phosphate or other commercial cleaning product is recommended.

Note: System volume can be calculated at this stage by metering the initial fill of the system.

SELECTING APPROPRIATE CONCENTRATION

Minimum recommended concentration is 25% ENVIRO-FROST 100: 75% water for most applications. Further dilution may render the corrosion inhibitors ineffective or may be at risk for bacterial contamination. Maximum recommended concentration is 60% ENVIRO-FROST 100: 40% water for efficient heat transfer. The actual concentration needed depends on the operating temperature in a refrigeration system or temperature range during winter. This product offers two types of protection: burst or freeze protection.

Burst protection is appropriate if the system will be dormant when the temperature is below the freezing point of the solution. Burst protection is also adequate in HVAC systems where there is sufficient space to accommodate the expansion of an ice\slush mixture and if the system is inactive during the winter.

Freeze protection is required in systems when fluid will be pumped at the lowest anticipated temperature. This is vital when no ice crystals are permitted or if there is inadequate space to accommodate ice\slush formation. For sufficient freeze protection the solution must maintain a freezing point at least 3°C below the lowest expected temperature.

Table 1. Concentrations required to provide burst and freeze protection at different temperatures.

Temperature		Burst Protection		Freeze Protection	
F	C	% Volume ENVIRO-FROST 100	% Volume ENVIRO-FROST 100	% Volume ENVIRO-FROST 100	% Volume ENVIRO-FROST 100
20	-7	12.6		18.8	
10	-12	20.9		30.4	
0	-18	25.1		37.7	
-10	-23	29.3		44.0	
-20	-29	31.4		48.2	
-30	-34	34.6		52.4	
-40	-40	36.6		56.5	
-50	-46	36.6		59.7	
-60	-51	36.6		62.8	

These figures are examples only and may not be appropriate for all situations. For adequate protection you should select a temperature at least 3°C (5°F) below the lowest expected temperature. Use conditions are not within our control and therefore we offer no guarantee or warranty, express or implied, on results from use of the information or products herein.

SELECTING APPROPRIATE CONCENTRATION

If a lower freezing point is required the concentration of ENVIRO-FROST 100 should be increased accordingly. The formula below can be used to determine the amount of solution to drain and the number of litres of ENVIRO-FROST 100 needed to reach desired concentration.

$$A = \frac{V(D - C)}{(100 - C)}$$

To decrease the ENVIRO-FROST 100 concentration use the following formula to determine the volume of solution to be drained and replaced with high quality water.

$$A = \frac{V(C - D)}{C}$$

Where,

A = Quantity (liters or gallons) of ENVIRO-FROST 100 fluid to be added to the system to lower the freeze point, or the quantity of glycol solution that must be drained from the system to decrease glycol concentration.

V = Total solution capacity of the system, (in liters or gallons).

D = Desired volume percent of ENVIRO-FROST 100 fluid in the system.

C = Current volume percent of ENVIRO-FROST 100 fluid in the system.

Table 2. Volume of heat transfer fluid per length of pipe*.

Nominal Pipe Size (inches)	Nominal Pipe Size (mm)	Wall Thickness (inches)	Wall Thickness (mm)	Inside Diameter (inches)	Inside Diameter (mm)	USG per 100 Ft of Pipe	Liters per 1 m of Pipe
¼	8	0.088	2.24	0.364	9.25	0.541	0.067
3/8	10	0.091	2.31	0.493	12.52	0.992	0.123
½	15	0.109	2.77	0.622	15.80	1.579	0.196
¾	20	0.113	2.87	0.824	20.93	2.770	0.344
1	25	0.133	3.38	1.049	26.64	4.490	0.558
1 ¼	32	0.140	3.56	1.380	35.05	7.770	0.965
1 ½	40	0.145	3.68	1.610	40.89	10.576	1.313
2	50	0.154	3.91	2.067	52.50	17.433	2.165
2 ½	65	0.203	5.16	2.469	62.71	24.873	3.089
3	80	0.216	5.49	3.068	77.93	38.406	4.769
3 ½	90	0.226	5.74	3.548	90.11	51.363	6.378
4	100	0.237	6.02	4.026	102.26	66.135	8.213
5	125	0.258	6.55	5.047	128.19	103.933	12.906
6	150	0.280	7.11	6.065	154.05	150.089	18.638
8	200	0.322	8.18	7.981	202.70	259.897	32.274
10	250	0.365	9.27	10.020	254.50	409.659	50.871
12	300	0.406	10.31	11.938	303.20	581.501	72.211

*Commercial Steel Pipe – Schedule 40 and Standard weight as per ASTM B36.10.

Table 3. Typical freezing and boiling points of aqueous solutions of ENVIRO-FROST 100

Freezing Point					Boiling Point		
°F	°C	Wt % Propylene Glycol	Vol. % Propylene Glycol	Vol. % ENVIRO-FROST 100	°F @ 760 mm Hg	°C @ 0.96 Barr	Refractive Index
32.0	0.0	0.0	0.0	0.0	212	100	1.3328
29.1	-1.6	5.0	4.8	5.0	212	100	1.3383
26.1	-3.3	10.0	9.6	10.0	212	100	1.3438
22.9	-5.1	15.0	14.5	15.1	212	100	1.3495
19.2	-7.1	20.0	19.4	20.3	213	101	1.3555
18.3	-7.6	21.0	20.4	21.3	213	101	1.3567
17.6	-8.0	22.0	21.4	22.4	213	101	1.3579
16.6	-8.6	23.0	22.4	23.4	213	101	1.3591
15.6	-9.1	24.0	23.4	24.5	213	101	1.3603
14.7	-9.6	25.0	24.4	25.5	214	101	1.3615
13.7	-10.2	26.0	25.3	26.5	214	101	1.3627
12.6	-10.8	27.0	26.4	27.6	214	101	1.3639
11.5	-11.4	28.0	27.4	28.6	215	102	1.3651
10.4	-12.0	29.0	28.4	29.7	215	102	1.3663
9.2	-12.7	30.0	29.4	30.7	216	102	1.3675
7.9	-13.4	31.0	30.4	31.8	216	102	1.3687
6.6	-14.1	32.0	31.4	32.8	216	102	1.3698
5.3	-14.8	33.0	32.4	33.9	216	102	1.3710
3.9	-15.6	34.0	33.5	35.0	216	102	1.3621
2.4	-16.4	35.0	34.4	36.0	217	103	1.3733
0.8	-17.3	36.0	35.5	37.1	217	103	1.3744
-0.8	-18.2	37.0	36.5	38.2	217	103	1.3756
-2.4	-19.1	38.0	37.5	39.2	218	103	1.3767
-4.2	-20.1	39.0	38.5	40.3	218	103	1.3779
-6.0	-21.1	40.0	39.6	41.4	219	104	1.3790
-7.8	-22.1	41.0	40.6	42.4	219	104	1.3802
-9.8	-23.2	42.0	41.6	43.5	219	104	1.3813
-11.8	-24.3	43.0	42.6	44.5	219	104	1.3825
-13.9	-25.5	44.0	43.7	45.7	219	104	1.3836
-16.1	-26.7	45.0	44.7	46.7	220	104	1.3847
-18.3	-27.9	46.0	45.7	47.8	220	104	1.3858
-20.7	-29.3	47.0	46.8	48.9	220	104	1.3870
-23.1	-30.6	48.0	47.8	50.0	221	105	1.3881
-25.7	-32.1	49.0	48.9	51.1	221	105	1.3892
-28.3	-33.5	50.0	49.9	52.2	222	106	1.3903
-31.0	-35.0	51.0	50.9	53.2	222	106	1.3914
-33.8	-36.6	52.0	51.9	54.3	222	106	1.3924
-36.7	-38.2	53.0	53.0	55.4	223	106	1.3935
-39.7	-39.8	54.0	54.0	56.5	223	106	1.3945
-42.8	-41.6	55.0	55.0	57.5	223	106	1.3956
-46.0	-43.3	56.0	56.0	58.5	223	106	1.3966
-49.3	-45.2	57.0	57.0	59.6	224	107	1.3977
-52.7	-47.1	58.0	58.0	60.6	224	107	1.3987
-56.2	-49.0	59.0	59.0	61.7	224	107	1.3998
-59.9	-51.1	60.0	60.0	62.7	225	107	1.4008
B	B	65.0	65.0	68.0	227	108	1.4058
B	B	70.0	70.0	73.2	230	110	1.4104
B	B	75.0	75.0	78.4	237	114	1.4150
B	B	80.0	80.0	83.6	245	118	1.4193
B	B	85.0	85.0	88.9	257	125	1.4235
B	B	90.0	90.0	94.1	270	132	1.4275
B	B	95.0	95.0	99.3	310	154	1.4315

B: Freezing points below -51°C (-60°F)

≈ Typical properties, not to be construed as specifications.

CORROSION PROTECTION

ENVIRO-FROST 100 contains a specially formulated corrosion inhibitor for metals typically found in heating and cooling systems. The ASTM D1384 corrosion test measures the relative corrosion protection provided by different solutions. Table 4 shows relative corrosion rates for ENVIRO-FROST 100 vs uninhibited propylene glycol and plain water. These results indicate that ENVIRO-FROST 100 falls well within the acceptable range of corrosion limits considered adequate under the test. Rates above 0.5 mpy (2.5 mpy for aluminium) are generally indicative of inadequate corrosion protection.

Note: ASTM D1384 is a screening test and as such may not be indicative of performance in actual systems. Excessive contaminants (>25 ppm) such as chlorides, sulfates or ammonia can contribute to increased corrosion rates.

Table 4. Corrosion test results in plain water, propylene glycol and ENVIRO-FROST 100, rates shown in mils penetration per year (weight loss in mg). Rates above 0.5 mpy (2.5 mpy for aluminium) indicate inadequate corrosion protection.

	Water	Propylene Glycol	ENVIRO-FROST 100
Copper	0.08	0.16	0.15
Solder	3.14	34.7	0.29
Brass	0.23	0.20	0.02
Mild Steel	9.69	9.80	0.03
Cast Iron	21.2	16.2	0.15
Aluminum	13.2	1.80	1.11

ASTM D1384 - 88°C (190°F) for 2 weeks. 30% by volume glycol, air bubbling.

Table 5. Densities of aqueous solutions of ENVIRO-FROST 100

Temp C	Volume percent Propylene Glycol									
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%
-35							1.0741	1.0809	1.0957	1.0937
-30						1.0648	1.0725	1.0790	1.0921	1.0900
-25						1.0633	1.0708	1.0770	1.0884	1.0864
-20					1.0531	1.0617	1.0689	1.0749	1.0847	1.0827
-15					1.0516	1.0599	1.0669	1.0727	1.0810	1.0789
-10				1.0406	1.0500	1.0580	1.0648	1.0704	1.0772	1.0752
-5			1.0284	1.0391	1.0482	1.0560	1.0626	1.0679	1.0735	1.0714
0		1.0150	1.0270	1.0374	1.04623	1.0539	1.0602	1.0653	1.0697	1.0677
5	1.0067	1.0137	1.0255	1.0356	1.0443	1.0516	1.0577	1.0626	1.0659	1.0638
10	1.0043	1.0124	1.0238	1.0337	1.0421	1.0492	1.0551	1.0597	1.0620	1.0600
15	1.0019	1.0109	1.0220	1.0317	1.0398	1.0467	1.0523	1.0567	1.0582	1.0561
20	0.9994	1.0093	1.0202	1.0295	1.0374	1.0440	1.0494	1.0536	1.0543	1.0523
25	0.9969	1.0075	1.0181	1.0272	1.0349	1.0413	1.0464	1.0504	1.0504	1.0484
30	0.9943	1.0057	1.0160	1.0248	1.0322	1.0383	1.0433	1.0470	1.0465	1.0444
35	0.9917	1.0037	1.0137	1.0222	1.0294	1.0353	1.0400	1.0436	1.0425	1.0405
40	0.9890	1.0016	1.011	1.0196	1.0264	1.0321	1.0366	1.0400	1.0385	1.0365
45	0.9863	0.9994	1.0088	1.0168	1.0234	1.0288	1.0331	1.0363	1.0345	1.0325
50	0.9835	0.9970	1.0061	1.0138	1.0202	1.0254	1.0295	1.0324	1.0305	1.0285
55	0.9807	0.9945	1.0033	1.0108	1.0169	1.0219	1.0257	1.0284	1.0265	1.0244
60	0.9778	0.9919	1.0004	1.0076	1.0134	1.0182	1.0218	1.0243	1.0224	1.0204
65	0.9749	0.9892	0.9974	1.0043	1.0099	1.0144	1.0178	1.0201	1.0183	1.0163
70	0.9719	0.9864	0.9942	1.0008	1.0062	1.0104	1.0136	1.0158	1.0142	1.0122
75	0.9688	0.9834	0.9910	0.9972	1.0023	1.0064	1.0093	1.00113	1.0101	1.0080
80	0.9657	0.9803	0.9875	0.9935	0.9984	1.0022	1.0049	1.0067	1.0059	1.0039
85	0.9626	0.9771	0.9840	0.9897	0.9943	0.9978	1.0004	1.0020	1.0017	0.9997
90	0.9593	0.9738	0.9804	0.9858	0.9901	0.9934	0.9957	0.9971	0.9975	0.9955
95	0.9560	0.9703	0.9766	0.9817	0.9857	0.9888	0.991	0.9922	0.9933	0.9913
100	0.9526	0.9668	0.9727	0.9775	0.9812	0.9841	0.9860	0.9871	0.9891	0.9870
105	0.9492	0.9631	0.9686	0.9731	0.9766	0.9793	0.9810	0.9819	0.9848	0.9927
110	0.9457	0.9592	0.9645	0.9686	0.9719	0.9743	0.9758	0.9765	0.9805	0.9784
115	0.9421	0.9553	0.9602	0.9641	0.9670	0.9692	0.9705	0.9710	0.9762	0.9741
120	0.9385	0.9512	0.9557	0.9593	0.9620	0.9640	0.9651	0.9655	0.9718	0.9698

☐ = At or above atmospheric boiling point

SAFETY, HANDLING, STORAGE, AND DISPOSAL OF ENVIRO-FROST 100

TOXICOLOGY: Avoid skin and eye contact. Please refer to SDS for complete toxicological information.

STORAGE: Storage of ENVIRO-FROST 100 presents no unusual problems. The product does not readily solidify, is low in toxicity, has a high flashpoint, and can be handled without posing a hazard to health. As a precaution, sparks or flames should be avoided during transfer or processing operations because undiluted glycol's can be ignited. Tank truck shipments can be emptied into storage tanks or clean drums.

TANK STORAGE: Ordinary steel tanks are normally satisfactory for storage of ENVIRO-FROST 100. However, during extended storage, slight discoloration may occur from iron contamination. Rusting may occur in the vapor space because there is no inhibitor where condensation occurs and oxygen is present. This situation can be minimized by closing any vent to the tank to limit oxygen intake. Insulation and heat are required for storage of ENVIRO-FROST 100 at low temperatures. This will prevent freezing or pumping problems due to high viscosity.

DRUM STORAGE: Store in original container with lid tightly closed. Product is hygroscopic, and will absorb water if left exposed to air.

Environmental Considerations: Propylene glycol is biodegradable and should not accumulate in water systems. The possibility of an environmental hazard cannot be excluded in the case of improper handling or disposal. Spills into lakes or rivers, should be avoided, since rapid oxygen depletion may have harmful effects on aquatic organisms.