MADE IN SK
www.enviroway.ca
2241 Hanselman Ave. Saskatoon, SK S7L 6A7
306-244-7727
TF 1-888-274-0862

# ENVIRO-THERM 100

## INHIBITED ETHYLENE GLYCOL HEAT TRANSFER FLUID

ETHYLÈNE GLYCOL INHIBÉ
FLUIDE DE TRANSFERT DE CHALEUR

CODE : ENV-1452


## DESCRIPTION

This high quality, heavy duty, coolant and heat transfer agent contains a specially designed package of corrosion inhibitors to protect copper brass, cast iron, solder, aluminium and other metals commonly used in industrial heating and cooling systems. In solution it provides protection below -54.9°C and burst protection to below -73°C. In addition to good freeze and corrosion protection, this product has a mild odour and low volatility.

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

***Do not mix with propylene glycol heat transfer fluids.***

## SPECIFICATIONS

| Properties | Specifications |
|---|---|
| Appearance | Clear |
| Specific Gravity @ 20C˚ | 1.128 - 1.134 |
| Refractive index @ 20˚C | 1.430 - 1.433 |
| Reserve Alkalinity | 11.0 minimum |
| pH (50% by volume) | 9.0-10.5 |
| Freeze Point | -16˚C |
| Antifoam | Present |
| **Composition** (% by weight) | |
| Total Glycols | 93.0 – 96.0 minimum |
| Inhibitors | 1.0 – 3.5 minimum |
| Water | 0.5 – 4.0 maximum |

**Recommended use temperature range: -50 C to 120 C**

## APPLICATIONS

ENVIRO-THERM 100 is compatible with most industrial grade ethylene glycol based systems. For use in stationary engines used in applications such as crude oil, natural gas, oil field operations, irrigation, power generating systems, and portable air compressors. Can also be used in snow melting systems for walkways, roads, loading ramps, and airfield runways; coolant for skating rinks, or in air conditioning or similar systems to replace brine solutions as a heat transfer medium. It is also hygroscopic (attracts moisture) which is useful in dehumidification applications.

## ALTERNATE CONCENTRATION

ENVIRO-THERM 50 (code: ENV-1453) is a prediluted solution that is considered ready-to-use for most applications.

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

NO ANIMAL TESTING + INGREDIENTS

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.

PROGRESSIVE CHEMISTRY

ENVIRO-THERM 100 features the highest maximum temperature use range of any glycol.

READILY BIODEGRADABLE

EnviroWay CLEAN YOUR WORLD

INDUSTRIAL

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## 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-THERM 100. Specifically if previous fluid is incompatible with the new inhibited glycol fluid. 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-THERM 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-THERM 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-THERM 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-THERM 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 is 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 F | Temperature C | Burst Protection % Volume ENVIRO-THERM 100 | Freeze Protection % Volume ENVIRO-THERM 100 |
|---|---|---|---|
| 20 | -7 | 11.5 | 16.8 |
| 10 | -12 | 17.8 | 26.2 |
| 0 | -18 | 23.1 | 34.6 |
| -10 | -23 | 27.3 | 40.9 |
| -20 | -29 | 31.4 | 46.1 |
| -30 | -34 | 31.4 | 50.3 |
| -40 | -40 | 31.4 | 54.5 |
| -50 | -46 | 31.4 | 58.7 |
| -60 | -51 | 31.4 | 62.9 |

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.

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## SELECTING APPROPRIATE CONCENTRATION

If a lower freezing point is required the concentration of ENVIRO-THERM 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-THERM 100 needed to reach desired concentration.

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

To decrease the ENVIRO-THERM 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-THERM 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-THERM 100 fluid in the system.

C = Current volume percent of ENVIRO-THERM 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.

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

| Freezing Point | | | | | Boiling Point | | |
|---|---|---|---|---|---|---|---|
| °F | °C | Wt % Ethylene Glycol | Vol. % Ethylene Glycol | Vol. % ENVIRO-THERM 100 | °F @ 760 mm Hg | °C @ 0.96 Barr | Refractive Index 22°C |
| 32.0 | 0.0 | 0.0 | 0.0 | 0.0 | 212.0 | 100.0 | 1.3328 |
| 29.1 | -1.6 | 5.0 | 4.4 | 4.6 | 213.0 | 101.0 | 1.3378 |
| 26.1 | -3.3 | 10.0 | 8.9 | 9.3 | 214.0 | 101.0 | 1.3428 |
| 22.9 | -5.1 | 15.0 | 13.6 | 14.2 | 215.0 | 102.0 | 1.3478 |
| 19.2 | -7.1 | 20.0 | 18.1 | 19.0 | 216.0 | 102.0 | 1.3530 |
| 18.3 | -7.6 | 21.0 | 19.2 | 21.1 | 216.0 | 102.0 | 1.3540 |
| 17.6 | -8.0 | 22.0 | 20.1 | 21.0 | 216.0 | 102.0 | 1.3551 |
| 16.6 | -8.6 | 23.0 | 21.0 | 22.0 | 217.0 | 103.0 | 1.3561 |
| 15.6 | -9.1 | 24.0 | 22.0 | 23.0 | 217.0 | 103.0 | 1.3572 |
| 14.7 | -9.6 | 25.0 | 22.9 | 24.0 | 218.0 | 103.0 | 1.3582 |
| 13.7 | -10.2 | 26.0 | 23.9 | 25.0 | 218.0 | 103.0 | 1.3593 |
| 12.6 | -10.8 | 27.0 | 24.8 | 26.0 | 218.0 | 103.0 | 1.3603 |
| 11.5 | -11.4 | 28.0 | 25.8 | 27.0 | 219.0 | 104.0 | 1.3614 |
| 10.4 | -12.0 | 29.0 | 26.7 | 28.0 | 219.0 | 104.0 | 1.3624 |
| 9.2 | -12.7 | 30.0 | 27.7 | 29.0 | 220.0 | 104.0 | 1.3635 |
| 7.9 | -13.4 | 31.0 | 28.7 | 30.2 | 220.0 | 104.0 | 1.3646 |
| 6.6 | -14.1 | 32.0 | 29.6 | 31.0 | 220.0 | 104.0 | 1.3656 |
| 5.3 | -14.8 | 33.0 | 30.6 | 32.0 | 220.0 | 104.0 | 1.3667 |
| 3.9 | -15.6 | 34.0 | 31.6 | 33.1 | 220.0 | 104.0 | 1.3678 |
| 2.4 | -16.4 | 35.0 | 32.6 | 34.1 | 221.0 | 105.0 | 1.3688 |
| 0.8 | -17.3 | 36.0 | 33.5 | 35.1 | 221.0 | 105.0 | 1.3699 |
| -0.8 | -18.2 | 37.0 | 34.5 | 36.1 | 221.0 | 105.0 | 1.3709 |
| -2.4 | -19.1 | 38.0 | 35.5 | 37.2 | 221.0 | 105.0 | 1.3720 |
| -4.2 | -20.1 | 39.0 | 36.5 | 38.2 | 221.0 | 105.0 | 1.3730 |
| -6.0 | -21.1 | 40.0 | 37.5 | 39.3 | 222.0 | 105.0 | 1.3741 |
| -7.8 | -22.1 | 41.0 | 38.5 | 40.3 | 222.0 | 106.0 | 1.3752 |
| -9.8 | -23.2 | 42.0 | 39.5 | 41.4 | 222.0 | 106.0 | 1.3763 |
| -11.8 | -24.3 | 43.0 | 40.5 | 42.4 | 223.0 | 106.0 | 1.3774 |
| -13.9 | -25.5 | 44.0 | 41.5 | 43.5 | 223.0 | 106.0 | 1.3785 |
| -16.1 | -26.7 | 45.0 | 42.5 | 44.5 | 224.0 | 107.0 | 1.3796 |
| -18.3 | -27.9 | 46.0 | 43.5 | 45.5 | 224.0 | 107.0 | 1.3807 |
| -20.7 | -29.3 | 47.0 | 44.5 | 46.6 | 224.0 | 107.0 | 1.3817 |
| -23.1 | -30.6 | 48.0 | 45.5 | 47.6 | 224.0 | 107.0 | 1.3828 |
| -25.7 | -32.1 | 49.0 | 46.6 | 48.8 | 224.0 | 107.0 | 1.3838 |
| -28.3 | -33.5 | 50.0 | 47.6 | 49.8 | 225.0 | 107.0 | 1.3796 |
| -31.0 | -35.0 | 51.0 | 48.6 | 50.9 | 225.0 | 107.0 | 1.3859 |
| -33.8 | -36.6 | 52.0 | 49.6 | 51.9 | 225.0 | 107.0 | 1.3869 |
| -36.7 | -38.2 | 53.0 | 50.6 | 53.0 | 226.0 | 108.0 | 1.3879 |
| -39.7 | -39.8 | 54.0 | 51.6 | 54.0 | 226.0 | 108.0 | 1.3890 |
| -42.8 | -41.6 | 55.0 | 52.7 | 55.2 | 227.0 | 108.0 | 1.3900 |
| -46.0 | -43.3 | 56.0 | 53.7 | 56.2 | 227.0 | 108.0 | 1.3910 |
| -49.3 | -45.2 | 57.0 | 54.7 | 57.3 | 228.0 | 109.0 | 1.3921 |
| -52.7 | -47.1 | 58.0 | 55.7 | 58.3 | 228.0 | 109.0 | 1.3931 |
| -56.2 | -49.0 | 59.0 | 56.8 | 59.5 | 229.0 | 109.0 | 1.3942 |
| -59.9 | -51.1 | 60.0 | 57.8 | 60.5 | 230.0 | 110.0 | 1.3952 |
| B | B | 65.0 | 62.8 | 65.8 | 235.0 | 113.0 | 1.4003 |
| B | B | 70.0 | 68.3 | 71.5 | 242.0 | 117.0 | 1.4055 |
| B | B | 75.0 | 73.6 | 77.1 | 248.0 | 120.0 | 1.4107 |
| -52.2 | -46.8 | 80.0 | 78.9 | 82.6 | 255.0 | 124.0 | 1.4159 |
| -34.5 | -36.9 | 85.0 | 84.3 | 88.3 | 273.0 | 134.0 | 1.4208 |
| -21.6 | -29.8 | 90.0 | 89.7 | 93.9 | 285.0 | 141.0 | 1.4255 |
| -3.00 | -19.4 | 95.0 | 95.0 | 99.5 | 317.0 | 158.0 | 1.4300 |

**B: Freezing points below -49°C (-55°F)**

**≈ Typical properties, not to be construed as specifications.**

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## CORROSION PROTECTION

Corrosion protection: ENVIRO-THERM 100 contains a specially formulated corrosion inhibitor for metals typically found in heating and cooling systems. The4 ASTM D1384 corrosion test measures the relative corrosion protection provided by different solutions. Table 4 shows relative corrosion rates for ENVIRO-THERM 100 vs uninhibited propylene glycol and plain water. These results indicate that ENVIRO-THERM 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 (>25ppm) such as chlorides, sulfates or ammonia can contribute to increased corrosion rates.

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

| | Water | Ethylene Glycol | ENVIRO-THERM 100 |
|---|---|---|---|
| Copper | 0.08 | 0.16 | 0.02 |
| Solder | 3.14 | 56.5 | 0.37 |
| Brass | 0.23 | 0.46 | 0.01 |
| Mild Steel | 9.69 | 44.5 | <0.01 |
| Cast Iron | 21.2 | 55.7 | 0.19 |
| Aluminum | 13.2 | 19.8 | 0.25 |

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

**Table 5. Densities of aqueous solutions of ENVIRO-THERM 100**

| Temp | Volume percent Ethylene glycol | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| C | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% |
| -35 | | | | | | | 1.1058 | 1.1199 | 1.1334 | |
| -30 | | | | | | 1.0903 | 1.1048 | 1.1186 | 1.1320 | 1.1448 |
| -25 | | | | | 1.0472 | 1.0892 | 1.1036 | 1.1173 | 1.1305 | 1.1432 |
| -20 | | | | | 1.0732 | 1.0881 | 1.1023 | 1.1158 | 1.1288 | 1.1413 |
| -15 | | | | 1.0566 | 1.0721 | 1.0868 | 1.1009 | 1.1142 | 1.1271 | 1.1394 |
| -10 | | | | 1.0555 | 1.0708 | 1.0854 | 1.0993 | 1.1125 | 1.1252 | 1.1374 |
| -5 | | | 1.0380 | 1.0543 | 1.0695 | 1.0839 | 1.0977 | 1.1107 | 1.1232 | 1.1352 |
| 0 | | 1.0199 | 1.0368 | 1.0530 | 1.0680 | 1.0823 | 1.0959 | 1.1087 | 1.1211 | 1.1329 |
| 5 | 1.0067 | 1.0187 | 1.0355 | 1.0515 | 1.0664 | 1.0805 | 1.0940 | 1.1067 | 1.1188 | 1.1305 |
| 10 | 1.0043 | 1.0174 | 1.0341 | 1.0499 | 1.0647 | 1.0787 | 1.0919 | 1.1045 | 1.1165 | 1.1279 |
| 15 | 1.0019 | 1.0160 | 1.0325 | 1.0482 | 1.0628 | 1.0767 | 1.0898 | 1.1022 | 1.1140 | 1.1253 |
| 20 | 0.9994 | 1.0145 | 1.0309 | 1.0464 | 1.0609 | 1.0745 | 1.0875 | 1.0997 | 1.1114 | 1.1225 |
| 25 | 0.9969 | 1.0128 | 1.0291 | 1.0445 | 1.0588 | 1.0723 | 1.0851 | 1.0971 | 1.1086 | 1.1196 |
| 30 | 0.9943 | 1.0110 | 1.0272 | 1.0424 | 1.0566 | 1.0699 | 1.0826 | 1.0945 | 1.1058 | 1.1166 |
| 35 | 0.9917 | 1.0092 | 1.0251 | 1.0402 | 1.0542 | 1.0675 | 1.0799 | 1.0917 | 1.1028 | 1.1134 |
| 40 | 0.9890 | 1.0071 | 1.0230 | 1.0379 | 1.0518 | 1.0649 | 1.0772 | 1.0887 | 1.0997 | 1.1101 |
| 45 | 0.9863 | 1.0050 | 1.0207 | 1.0355 | 1.0492 | 1.0621 | 1.0743 | 1.0857 | 1.0965 | 1.1067 |
| 50 | 0.9835 | 1.0027 | 1.0183 | 1.0330 | 1.0465 | 1.0593 | 1.0713 | 1.0825 | 1.0932 | 1.1032 |
| 55 | 0.9807 | 1.0003 | 1.0158 | 1.0303 | 1.0437 | 1.0563 | 1.0681 | 1.0792 | 1.0897 | 1.0996 |
| 60 | 0.9778 | 0.9973 | 1.0131 | 1.0275 | 1.0408 | 1.0532 | 1.0649 | 1.0758 | 1.0861 | 1.0958 |
| 65 | 0.9749 | 0.9952 | 1.0104 | 1.0246 | 1.0377 | 1.0500 | 1.0615 | 1.0723 | 1.0824 | 1.0920 |
| 70 | 0.9719 | 0.9925 | 1.0075 | 1.0216 | 1.0345 | 1.0467 | 1.0580 | 1.0686 | 1.0786 | 1.0880 |
| 75 | 0.9688 | 0.9896 | 1.0045 | 1.0184 | 1.0312 | 1.0432 | 1.0544 | 1.0648 | 1.0746 | 1.0838 |
| 80 | 0.9657 | 0.9866 | 1.0013 | 1.0151 | 1.0278 | 1.0396 | 1.0507 | 1.0609 | 1.0706 | 1.0796 |
| 85 | 0.9626 | 0.9835 | 0.9981 | 1.0117 | 1.0243 | 1.0359 | 1.0468 | 1.0569 | 1.0664 | 1.0752 |
| 90 | 0.9593 | 0.9803 | 0.9947 | 1.0082 | 1.0206 | 1.0321 | 1.0428 | 1.0528 | 1.0621 | 1.0707 |
| 95 | 0.9560 | 0.9769 | 0.9912 | 1.0046 | 1.0168 | 1.0282 | 1.0387 | 1.0485 | 1.0576 | 1.0661 |
| 100 | 0.9526 | 0.9734 | 0.9876 | 1.0008 | 1.0129 | 1.0241 | 1.0345 | 1.0441 | 1.0531 | 1.0614 |
| 105 | 0.9492 | 0.9698 | 0.9839 | 0.9969 | 1.0088 | 1.0199 | 1.0301 | 1.0396 | 1.0484 | 1.0565 |
| 110 | 0.9457 | 0.9661 | 0.9800 | 0.9929 | 1.0047 | 1.0156 | 1.0257 | 1.0350 | 1.0436 | 1.0516 |
| 115 | 0.9421 | 0.9622 | 0.9760 | 0.9888 | 1.0004 | 1.0112 | 1.0211 | 1.0302 | 1.0387 | 1.0465 |
| 120 | 0.9385 | 0.9583 | 0.9719 | 0.9845 | 0.9960 | 1.0066 | 1.0164 | 1.0253 | 1.0336 | 1.0412 |

= At or above atmospheric boiling point

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# SAFETY, HANDLING, STORAGE, AND DISPOSAL OF ENVIRO-THERM 100

**TOXICOLOGY:** Do not ingest. Avoid skin and eye contact. Please refer to SDS for complete toxicological information.

**STORAGE:** Storage of ENVIRO-THERM 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-THERM 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-THERM 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. Drums should be stored inside a heated building when temperatures below -16°C are anticipated.

**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.