

Propylene and Ethylene Glycol Products for **All** Heat Transfer Needs



96% Ethylene Glycol



**For Aluminum Heat Exchangers
60% Propylene Glycol**



70% Propylene Glycol

Developed Specifically for the HVAC/R Industry

- Multiple formulations and packages available for specific requirements
- Formulated with time-proven corrosion inhibitors for optimum protection
- Glycols blended with deionized water for extended system duty
- Products incorporate a dye to assist leak detection in the field

Application

Many commercial and industrial water systems, particularly closed systems, are required to operate while being exposed to varying extremes in temperature. These extremes may approach the freezing point of water, making it necessary to suppress this freezing point in order to protect the system from freezing or bursting pipes. In other applications, it is necessary for the water to operate at temperatures below its freezing point (thermal storage, ice banks, etc.) or above its boiling point. As a result, suppression of the freezing point or raising of the boiling point becomes a matter of system design.

In all these applications, it is necessary to add a heat transfer solution to the water to achieve the desired operating temperature. In addition, the heat transfer solution should contain a corrosion inhibitor to protect system metal as closed systems are invariably troubled with corrosion in the absence of an inhibitor. Inhibited glycols, ethylene or propylene are typically the compounds used in applications for HVAC/R system freeze/burst protection, process heating/cooling, refrigeration coil defrosting, cold room dehumidifying, sprinkler systems and etc.



**70% Propylene Glycol
Heavy Duty Formula**



95% Propylene Glycol



**Non-dyed 95%
Propylene Glycol,
NSF registered**



35% Propylene Glycol

Propylene vs. Ethylene

There are two major differences between ethylene glycols and propylene glycols. One is toxicity and the other is viscosity. Ethylene glycol-based products are less viscous than propylene glycol-based products. Therefore, they can generally provide slightly better heat transfer efficiency and low temperature performance. However, in applications where toxicity is a concern, propylene glycol products are used because of their low acute oral toxicity. Examples are where contact with drinking water is possible or applications in localities where propylene glycol use is mandated by law.

Burst Protection vs. Freeze Protection

Burst protection is adequate if the system will remain dormant when the temperature is below the freezing point of the solution and there is adequate space to accommodate the expansion of the ice/slush mixture while the system is inactive. Nu-Calgon's glycols provide burst protection in the following manner: as the temperature drops below the solution's freezing point, ice crystals begin to form. Because water in the solution freezes first, the remaining glycol solution becomes further concentrated and remains fluid. The combination of ice crystals and glycol result in a flowable slush. Solution volume increases as the slush forms, with the extra volume flowing into available expansion volume in the system.

Freeze protection is required where the system's solution must be pumpable at the lowest anticipated temperature and/or where there is little to no room in the system for expansion to accommodate an ice/slush formation. The required concentration of glycol to achieve freeze protection will be dependent upon the operating conditions and the lowest expected ambient temperature. Closed chilled water systems that are subject to prolonged shutdown – but must start-up again while the weather is still cold – may require freeze protection. Freeze protection is appropriate for a closed loop system that must be protected in the event of power or pump failure. To obtain adequate freeze protection, the glycol solution must maintain a freezing point at least 5°F below the lowest anticipated ambient temperature.

Corrosion Protection

Nu-Calgon's glycol products contain the best available corrosion inhibitor packages for HVAC/R applications. The formulation provides optimum corrosion protection for most metals, including copper, steel, aluminum, brass, etc., and it does in two ways. First, the inhibitors passivate the system's metal surfaces, protecting them from attack by oxygen, acidity, etc. Furthermore, inhibitors used in the Nu-Calgon glycol do not form films that build up on themselves unlike automotive antifreezes which protect by forming thick silica-based gels or films which could affect heat transfer.

Secondly, the inhibitors buffer any acids formed as a result of glycol oxidation. All glycols naturally produce organic acids as degradation products, and this process can be accelerated in the presence of oxygen or heat. Without these inhibitors, these by-products could adversely lower pH and contribute to system corrosion. Nu-Calgon recommends a minimum 30-33% (volume) dilution for adequate corrosion protection for all glycol products.

Corrosion Test Results • Freez-Kontr'l
Weight Loss in Milligrams (Mils Penetration per Year)

	WATER	PROPYLENE GLYCOL	FREEZ-KONTR'L
Copper	2 (0.08)	4 (0.16)	1 (0.04)
Solder	99 (3.14)	1095 (34.7)	2 (0.06)
Brass	5 (0.23)	5 (0.20)	2 (0.08)
Mild Steel	212 (9.69)	214 (9.80)	1 (0.04)
Cast Iron	450 (21.2)	345 (16.2)	1 (0.05)
Aluminum	110 (13.2)	15 (1.80)	+3 (+0.36)

*Plus (+) indicates weight gain. Do not use on galvanized surfaces.



Evaluating Glycol Concentration

Nu-Calgon offers a glycol refractometer to assist in establishing the protection level of propylene or ethylene glycol in the system.
Part Number: 61301



Glycol/Oil Transfer Pump

Heavy-duty pump to assist in transferring propylene/ethylene based glycols and oil products (up to 1000 SUS) from Nu-Calgon supplied 55 gallon drums to its application.

- Type/Voltage: Gerotor Gear/Aluminum Housing, 115-220 dual volt AC
 - Flow Rate: Up to 4 gpm - varies on viscosity and suction lift.
 - Drum Connection: Assemblies to 2 inch drum bung
 - Motor: Rugged 1/2 hp motor designed for long life/limited maintenance
- Part Number: 4817-0



AquaCare T65 Demineralization Cartridge

- Use with fill water with diluting glycol
- Ensures high quality water with glycol dilution to aid service life
- Disposable, billable cartridge provides convenient to pre-blended glycol formulas
- Removes chloride, sulfate and nitrate salts that attack system metals
- Removes scale forming ions that damage components and block heat transfer
- Media changes color from blue to beige when resin is spent

Part Number: 4122-01



Total Glycol Analysis Program

- Comprehensive test program to analyze glycol health in system
 - Analyzes physical properties, inhibitor levels and corrosion, scale and wear indicators
 - Program includes recommendations from analysis
 - Program optimizes glycol drain intervals
 - Program identifies minor problems before they become major ones
- Part Number: 4997-0

Freez-Kontr'l® and Freez-Kontr'l® 95/5: Inhibited propylene glycol heat transfer fluid and antifreeze.

- **Typical Applications:** Food and beverage equipment, HVAC systems, process heating and cooling, computer cooling systems
- The ingredients used in its manufacture are GRAS (generally recognized as safe), under Title 21, Part 182 of the US Code of Federal Regulation, where accidental or incidental contact with potable water could occur.
- Blue dye formulation for system leak detection

Freez-Kontr'l Packaging

- 1 gallon bottle 4188-07
- 5 gallon pail 4188-05
- 55 gallon plastic drum 4188-02
- 275 gallon tote 4188-51

Dilution Chart • Freez-Kontr'l

Percent Volume of Freez-Kontr'l	Freeze Protection	Burst Protection
100%	Below -60°F	-100°F
90%	Below -60°F	-100°F
80%	-49°F	-100°F
75%	-39°F	-100°F
70%	-29°F	-100°F
65%	-17°F	-90°F
60%	-12°F	-79°F
55%	-6°F	-65°F
50%	+1°F	-52°F
45%	+5°F	-35°F
40%	+10°F	-19°F



70% Propylene Glycol

Dilution Chart • Freez-Kontr'l 95/5

Percent Volume of Freez-Kontr'l 95/5	Freeze Protection	Burst Protection
100%	Below -60°F	-100°F
75%	Below -60°F	-100°F
70%	Below -60°F	-100°F
65%	Below -60°F	-100°F
60%	-51°F	-100°F
55%	-42°F	-97°F
50%	-24°F	-95°F
45%	-17°F	-78°F
40%	-3°F	-62°F
35%	+2°F	-32°F
30%	+10°F	-19°F

Freez-Kontr'l 95/5 Packaging:
 5 gallon pail 4188-06
 55 gallon plastic drum 4188-03
 275 gallon tote 4188-50

95% Propylene Glycol



Freez-Kontr'l® FG Clear

Non-dyed/ full concentrate propylene glycol heat transfer fluid

- **Typical applications:** Food and Beverage Equipment, HVAC Systems,
- Process Heating and Cooling, Ideal for Top-Off Adjustments for Freeze/Burst Protection
- Formulated concentrate (95%) propylene glycol with corrosion inhibitor package
- Clear, non-dye formulation for applications where a colorant is not preferred – ideal for top off adjustments
- NSF Listed as a HT-1 fluid for in equipment or machine parts where incidental contact of the product with food is possible.
- Manufactured with ingredients classified as Generally Regarded as Safe (GRAS) by the FDA
- Nonflammable

Packaging

- 5 Gallon Pail 4188-11
- 55 Gallon Drum 4188-14

Dilution Chart • Freez-Kontr'l FG

Percent Volume of Freez-Kontr'l FG	Freeze Protection	Burst Protection
100%	Below -60°F	-100°F
75%	Below -60°F	-100°F
70%	Below -60°F	-100°F
65%	Below -60°F	-100°F
60%	-51°F	-100°F
55%	-42°F	-97°F
50%	-24°F	-95°F
45%	-17°F	-78°F
40%	-3°F	-62°F
35%	+2°F	-32°F
30%	+10°F	-19°F



95% Propylene Glycol

Freez-Kontr'l® 35: Ready-to-use inhibited propylene glycol heat transfer fluid for use in closed loop systems.

- Formulated as a complete, ready-to-use product
- Ideal for refrigeration and hydronic systems
- Meets typical rack manufacturer's specs
- Pre-mix product is suitable in warmer climate regions in applications that need modest freeze protection
- Fully inhibited to prevent corrosion in system
- Non-flammable
- Blue dye formulation for system leak detection

Freez-Kontr'l 35 Packaging:

- 5 gallon pail 4188-16
- 55 gallon plastic drum 4188-35

Specifications
 pH: 8.0 to 10.0
 Specific Gravity: 1.01 – 1.05
 Propylene Glycol: 35%
 Inhibitor: Dipotassium Phosphate
 Dye: FD&C Blue #1
 Freeze Protection: +2°F
 Burst Protection: -32°F



35% Propylene Glycol

Freez-Kontr'l® AP -100

Inhibited heat transfer and anti-freeze fluid formulated to current OEM requirements of 6.5-8pH with optimized inhibitors for aluminum heat exchangers. Suitable for other heat exchanger material designs.

- Premixed and ready-to-use
- Provides burst protection to -100°F and freeze protection to -60°F
- Maximum corrosion protection for all metals including aluminum and copper with proven inhibitor chemistry
- Non flammable
- Uses blue colorant for system leak detection
- Formulated for optimum fluid life with the use of deionized water

Packaging

5 gallon pail 4187-15

Dilution Chart

Percent Volume of Burst-Kontr'l AP -100	Freeze Protection	Burst Protection
100%	-60°F	-100°F
90%	-41°F	-95°F
85%	-31°F	-90°F
80%	-23°F	-83°F
75%	-17°F	-80°F
70%	-10°F	-73°F
65%	-5°F	-62°F
60%	+1°F	-52°F
55%	+5°F	-38°F
50%	+9°F	-25°F



**BLUE
DYE**

**For Aluminum Heat Exchangers
60% Propylene Glycol**

Corrosion Test Results of Burst-Kontr'l AP-100 per ASTM 1384

	Material Weight Loss (mg)		Material Corrosion Weight Loss (mg/cm2)	
	Sample Average	Maximum ¹	Sample Average	Maximum ²
Copper	0	10	0.02	0.15
Solder	0	30	0.01	0.3
Brass	0	10	0.01	0.15
Steel	2	10	0.05	0.15
Cast Iron	1	10	0.02	0.15
Cast Aluminum	0	30	-0.01	0.3

¹Maximum corrosion weight loss as specified by ASTM D3306.

²Maximum corrosion as specified by JIS K2234 type "B"

Freez-Kontr'l HD

Heavy-Duty Pink Formulation for Hydronic and Solar Applications

- **Typical applications:** Boiler hydronic systems, chilled hydronic systems, solar applications, sidewalk snow melting systems, thermal energy storage, process heating and cooling, refrigeration warehouse for floor heating, ice rinks and others
- Heavy-duty 70% propylene glycol-based heat transfer formulation
- Specifically designed for a higher operating temperature (325°F maximum)
- Formulation provides better stability when mixed with water containing up to 350ppm total hardness in a closed loop application
- Pink colored formulation to assist in system leak detection
- Nonflammable
- Freez-Kontr'l HD should NOT be used in refrigeration applications where there is a possibility of incidental contact with potable water or food. Nu-Calgon offers other Freez-Kontr'l options for these refrigeration applications

Packaging

5 Gallon Pail 4188-12

**PINK
DYE**



70% Propylene Glycol

Freez-Therm™

An ethylene glycol heat transfer fluid and freeze point suppressant for the HVAC/R industry.

- **Typical Applications:** Chemical processing, process heating and cooling, power plant heating and cooling systems
- Fully inhibited to prevent corrosion
- Specifically formulated for HVAC/R systems
- Effective over a broad temperature range
- Compatible with most materials
- Green dye formulation for system leak detection

Packaging

1 gallon bottle 4189-07

5 gallon pail 4189-05

55 gallon steel drum 4189-01

Dilution Chart

Percent Volume of Freez-Therm	Freeze Protection	Burst Protection
60%	-55°F	-100°F
55%	-40°F	-97°F
50%	-30°F	-95°F
45%	-20°F	-78°F
40%	-10°F	-60°F
35%	0°F	-32°F
30%	+5°F	-16°F



**GREEN
DYE**

96% Ethylene Glycol

Dilution Chart

Percent Volume of Freez-Kontr'l HD	Freeze Protection	Burst Protection
100%	Below -60°F	-100°F
90%	Below -60°F	-100°F
80%	-49°F	-100°F
75%	-39°F	-100°F
70%	-29°F	-100°F
65%	-17°F	-90°F
60%	-12°F	-79°F
55%	-6°F	-65°F
50%	+1°F	-52°F
45%	+5°F	-35°F
40%	+10°F	-19°F

General Guidelines

1. Existing Systems: Entire system should be cleaned and flushed. Since Freez-Kontr'l, Burst-Kontr'l AP-100 or 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.
2. New Systems: These systems may be coated with cutting oils, grease, solder, flux, etc. Therefore, a thorough cleaning of new systems is recommended; Use a low foaming, alkaline cleaner such as Nu-Calgon System Cleaner (4370-08). Rinse thoroughly. Do not use Nu-Calgon glycols on galvanized surfaces.
3. Select the product and the type of protection needed, burst or freeze protection. Once selected, consult the appropriate dilution table and identify the percentage (of system volume) that the Nu-Calgon glycol must comprise to achieve the desired protection. Remember, for freeze protection, you want to maintain a freeze point 5°F below the anticipated ambient temperature.
4. Identify the system's liquid volume and calculate the needed product.
5. Dilution with demineralized or deionized water is strongly recommended, particularly in areas with total hardness values greater than 100 ppm. Hard water can adversely interact with the glycol inhibitors and affect corrosion protection. The use of soft water is not recommended due to the possible presence of anions, such as chlorides or sulfates.
6. Circulate for 24 hours and check with a glycol refractometer.

