



# OPUS LUBRICANTS PRODUCT DATA

## FOODGRADE PG ANTIFREEZE

### Description

Opus Foodgrade PG Antifreeze is an inhibited propylene glycol specialist fluid for use in HVAC (heating, ventilation, air conditioning) systems, industrial heat transfer systems, food industry chilling and freezing systems.

It is strongly recommended that in areas of hard water Opus Foodgrade PG Antifreeze is diluted with demineralised or deionised water, as dissolved minerals in hard water can react with the inhibitors and precipitate out of solution. Opus Foodgrade PG Antifreeze is available in all standard pack sizes, it can also be supplied pre-diluted with deionised water for topping up or full system changes.

### **Why Use Opus Foodgrade PG Antifreeze?**

Freeze Protection -	Protect your systems down to $-50^{\circ}\text{C}$ . Eliminate the cost and nuisance associated with freeze damage.
Corrosion Protection -	Prolong the life of your capital plant by protecting against the corrosive attack of water and uninhibited glycols.
Safety -	Eliminate the risk of leakage for food and non-food applications. Protect your employees – safe to handle.
Secondary Heat Transfer -	Reduce your system maintenance and extend the life expectancy of your heat transfer fluid

### Safety

Safety must always come first for HVAC, industrial heat transfer, and chilling and refrigeration plants. Propylene Glycol on which Opus Foodgrade PG Antifreeze is based is recognised for its low toxicity and may be handled safely by individuals maintaining heat transfer systems.

Propylene Glycol may be used in food at levels not to exceed good manufacturing practice (see chart below). Additionally all additives used in Opus Foodgrade PG Antifreeze are food grade materials.



## FDA regulations on Use of Propylene Glycol

Level %	Food	Regulations*
5	Alcoholic Beverages	170.3 (n) (2)
24	Confectionery & Frostings	170.3 (n) (9)
2.5	Frozen Dairy Product	170.3 (n) (20)
97	Seasonings & Flavourings	170.3 (n) (26)
5	Nut and Nut Products	170.3 (n) (32)
2.0	All other food categories	

\*Code of Federal Regulations Food and Drug Administration.  
Department of Health and Human Services. Part 184.1666.

Opus Foodgrade PG Antifreeze is registered under the NSF non-food compound registration program under category code HT1 – Heat Transfer Fluids Incidental Food Contact.  
NSF Registration Number 136612



### Corrosion Protection

Opus Foodgrade PG Antifreeze provides superior corrosion protection. Its inhibitor package minimises effects of corrosion by buffering the organic acids that form during normal system operation. Plain water and uninhibited glycols are notorious for their corrosive attack on many metals – see table below.

### **Corrosion Effects of Heat Transfer Fluids (Corrosion Weight Loss in mg / coupon ASTM D1384)**

Metal	Plain Water	Uninhibited Propylene Glycol	Uninhibited Ethylene Glycol	Opus Foodgrade PG Antifreeze
Copper	2	4	4	4
Solder	100	1100	1800	1
Brass	5	5	10	4
Steel	215	215	975	1
Cast Iron	450	350	1200	3
Aluminium	110	15	165	2

The table above shows the relative corrosion rates of Opus Foodgrade PG Antifreeze heat transfer fluid compared to uninhibited ethylene glycol, propylene glycol, and plain water, and ably demonstrates that Opus Foodgrade PG Antifreeze provides a high level of corrosion protection for nearly all metals of construction used in HVAC or industrial cooling systems.



Q. Why not use Automotive Antifreeze ?

A. Automotive Antifreeze can be worse than plain water and uninhibited Glycols for heat transfer systems. Many modern Antifreezes contain silicate based inhibitors which coat heat exchange surfaces reducing their efficiency and have a tendency to gel thus fouling systems and reducing the life of pump seals. Additionally most Antifreezes are Ethylene Glycol based which is toxic by ingestion to humans and animals. N.B. Opus Foodgrade PG Antifreeze is not recommended for use with Galvanised steel. The zinc in the galvanised coating could react with inhibitor components, thus precipitating out of the fluid resulting fouling as well as inhibitor depletion

### **Secondary Heat Transfer**

Adding Opus Foodgrade PG Antifreeze significantly lowers your system maintenance requirements and increases its heat transfer fluid life expectancy thus securing your equipment investment.

- Provides improved heating and cooling efficiency for hospitals and industrial units.
- Extends the temperature range of water for both low and high temperature industrial testing baths.
- Is an excellent chilling medium for ice skating rinks and heating medium for ice snow melting and removal systems.

### **Typical Properties of Aqueous Solutions**

Typical properties of aqueous solution % wt PG\*

Physical Property	Temperature		% Opus Foodgrade PG Antifreeze			
	°C	°F	30	40	50	60
Thermal Conductivity (W/m.K)	4	40	0.425	0.384	0.344	0.311
	82	180	0.484	0.433	0.386	0.343
	177	350	0.476	0.431	0.386	0.341
Specific Heat (kJ/kg.K)	4	40	0.390	3.75	3.51	3.28
	82	180	4.02	3.91	3.76	3.64
	177	350	4.11	4.06	4.02	3.99
Viscosity (cP)	4	40	5.5	9.2	14.0	24.0
	82	180	0.68	0.85	1.1	1.3
	177	350	0.30	0.35	0.40	0.44
Density (g/ml)	4	40	1.04	1.05	1.06	1.06
	82	180	0.93	0.93	0.94	0.94

\* Typical properties - not to be construed as specifications



## **Freeze Protection**

Opus Foodgrade PG Antifreeze solutions can protect systems down to a temperature of - 50°C preventing cracked pipes, broken valves, coils and other freeze damage associated with the use of plain water. Adding Opus Foodgrade PG Antifreeze gives you system superior freeze protection.

### **Typical Uses**

- Prevents freeze burst problems in schools, offices, vacant property, caravans etc.
- Safeguards HVAC system lines down to temperatures of - 50°C.
- Protects water systems in marine and recreational vehicles freezing and bursting.
- Protects Industrial pre-heating coils during severe conditions.

<b>Temperature °C</b>	<b>%v/v Opus Foodgrade PG Antifreeze Required for Freeze Protection</b>	<b>%v/v Opus Foodgrade PG Antifreeze Required for Burst Protection</b>
-6	17	11
-12	26	18
-18	34	23
-24	41	28
-29	45	30
-35	49	33
-40	51	35
-46	53	35
-51	55	35

**Note:** These figures are examples only. For a factor of safety you should use the volume percentage appropriate for a temperature at least 2°C lower than the lowest temperature expected.

### **System Maintenance**

To ensure optimum protection against freezing and corrosion the level concentration of Opus Foodgrade PG Antifreeze with the heat transfer medium should be maintained at the level specified by the system manufacturer or installer. The level of Opus Foodgrade PG Antifreeze within the heat transfer medium can be easily determined by checking the specific gravity and reading off the concentration from the table below:

<b>Specific Gravity 20°/20°</b>	<b>% v/v Opus Foodgrade PG Antifreeze</b>	<b>Freezing Point °C</b>
1.020	20	-7
1.025	25	-9
1.030	30	-12
1.035	35	-16
1.039	40	-20
1.043	45	-25
1.047	50	-31
1.050	55	-37
1.053	60	-45



Assistance with analysis of concentration and inhibitor condition on samples drawn from systems filled with Opus Foodgrade PG Antifreeze solutions can be provided by Ferguson & Menzies Ltd Technical Department, contactable via your local sales office.

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