



COMPLEAT™ HTF

HEAT TRANSFER FLUID

COMPLEAT™ HTF – ETHYLENE GLYCOL
COMPLEAT™ HTF – PROPYLENE GLYCOL

FLEETGUARD®

COMPLEAT HTF – HEAT TRANSFER FLUID

In normal operations, heavy duty, liquid-cooled stationary engines and gen-sets are exposed to significant variations in temperature and weather conditions, and must be protected against both freezing and overheating. In addition, the antifreeze/coolant used in these engines must be formulated to provide diesel engine liner pitting protection, prevent corrosion and scale buildup, while operating at maximum efficiency.

Compleat HTF Heat Transfer Fluids have been formulated to meet the special needs of both stationary engines and line heaters. Compleat HTF is a universal heat transfer fluid, and can be used in the following applications:

APPLICATIONS:

- **Natural Gas Line Heaters**
- **LNG Vaporizers**
- **Natural Gas Well-Head Heaters**
- **Crude Oil Heaters**
- **Standby Engines/Gen-Sets**
- **Stored Equipment**
- **Heavy-Duty Diesel Engines**
- **Automobile & Light Duty Engines**
- **Natural Gas Compressor Engines**
- **Air Compressor Engines**
- **Drilling Equipment**
- **Irrigation Equipment**
- **Heat Tracing Systems**
- **Building Heating/Cooling Systems**
- **Refrigeration Systems (non food)**

FEATURES:

- Compleat HTF products are premium Heat Transfer Fluids and Universal Heavy Duty Antifreezes.
- They provide a superior, non-corrosive medium for Line Heaters, Choke Heaters, and Stationary Engines.
- HTF products contain DCA4, a Phosphate/Nitrite/Molybdate chemical inhibitor system which provides superior protection against ferrous metals corrosion, scaling, liner pitting, and cavitation.
- Compleat HTF Propylene Glycol is a less toxic, environmentally friendly product.
- DCA4 Supplemental Chemical Additive is available for reinhibition of heating and cooling systems.
- Restore and Restore Plus Cleaners are available for system cleaning.
- Analytical Services are available through the Fleetguard Monitor C Program.
- 3-Way test strips are available for field coolant testing.
- Compleat HTF products are available in Concentrate and Premix in bulk and drums.

COMPLEAT HTF – ETHYLENE GLYCOL

COMPLEAT HTF – EG CONCENTRATE is a premium quality, silicate-free, inhibited Ethylene Glycol based heat transfer fluid and industrial coolant. It contains DCA4, an effective heavy duty chemical inhibitor system which protects diesel engines from liner pitting, corrosion, and from hard water scale deposits. Compleat HTF – EG CONCENTRATE is intended for dilution with demineralized water or tap water with low mineral content.

COMPLEAT HTF – EG PREMIX is a premium quality, silicate-free, inhibited Ethylene Glycol based heat transfer fluid that also contains DCA4 heavy duty chemical inhibitor. It is intended for use in areas where demineralized or deionized water is not available. It is premixed 50/50 with demineralized water to provide protection down to -34°F , eliminating the need for dilution at the point of use.

COMPLEAT HTF – PROPYLENE GLYCOL

COMPLEAT HTF – PG CONCENTRATE is a premium quality, silicate-free, fully inhibited Propylene Glycol based heat transfer fluid and industrial coolant. Because of the PG based fluid and DCA4 inhibitor, Compleat HTF – PG provides superior diesel engine liner pitting and corrosion protection. Compleat HTF – PG is less toxic than EG based heat transfer fluids, environmentally friendly and fully biodegradable. Compleat HTF – PG Concentrate is intended for dilution with demineralized water or tap water with low mineral content.

COMPLEAT HTF – PG PREMIX is a premium quality, silicate-free, fully inhibited Propylene Glycol based heat transfer fluid which is premixed 50/50 with demineralized water. It contains DCA4 chemical inhibitor, and is intended for use in areas where demineralized water is not available. As a 50/50 Premix, it offers freeze protection down to -27°F . Improved freeze protection can be achieved by increasing the glycol content to a 60/40 dilution (-56°F), or a 55/45 (-40°F).

DCA4™ INHIBITOR

DCA4™ INHIBITOR is a state-of-the-art Supplementary Chemical Additive (SCA) which is designed to re-inhibit heat transfer fluids and industrial coolants. DCA4 Inhibitor is an environmentally friendly, less toxic chemical, which provides superior hard and soft metal protection in industrial coolant systems.

In the course of normal operations, the chemicals in the heat transfer fluids and industrial coolants deplete. Depletion rates are dependent on several factors including: operating conditions, excessive dilution, system leaks, blow by gases, etc. The use of DCA4 Inhibitor re-inhibits depleted coolant systems and extends the useful life of the coolant.

COOLANT ANALYSIS PROGRAM

MONITOR-C™ is a coolant analysis program designed to assist our customers in monitoring their heat transfer and industrial coolant systems. The Monitor-C program provides a detailed analysis of the depletion rates of the buffering agent chemicals, aluminum protection, liner pitting and corrosion protection, coolant concentration and freeze point, and the supplemental additive chemical needed to reinhibit the system. The Monitor-C analysis services are available through Compleat HTF distributors.

3-Way SCA Test Strips provide easy field testing of cooling systems for corrosion inhibitors and freeze point.

Quik-Chek Test Strips provide easy field testing of pH, Chloride, and Sulfate coolant condemnation levels.

PHYSICAL PROPERTIES

	EG CONC	EG 60 PREMIX 60/40	EG 50 PREMIX 50/50	EG 40 PREMIX 40/60	EG 30 PREMIX 70/30
ETHYLENE GLYCOL					
Composition, % volume (min)	95.0%	60.0%	50.0%	40.0%	30.0%
Color	Blue	Blue	Blue	Blue	Blue
Specific Gravity, 60/60 °F	1.13	1.09	1.08	1.06	1.05
Pounds per Gallon, 60 °F	9.41	9.07	9.01	8.83	8.74
Freezing Point, °F					
% aqueous sol by volume	8	-65	-34	-10	4
pH of Solutions	N/A	10.5	10.5	10.5	10.5
Reserve Alkalinity (min)	10.0	5.0	5.0	5.0	5.0
Boiling Point, °F	345	230	226	222	220
Flash Point (PMCC), °F	265	None	None	None	None
Fire Point (COC), °F	250	None	None	None	None
Ash Content, Mass % (max)	5.0	2.5	2.5	2.5	2.5

	PG CONC	PG 60 PREMIX 60/40	PG 50 PREMIX 50/50	PG 40 PREMIX 40/60	PG 30 PREMIX 70/30
PROPYLENE GLYCOL					
Composition, % volume (min)	95.0%	60.0%	50.0%	40.0%	30.0%
Color	Blue	Blue	Blue	Blue	Blue
Specific Gravity, 60/60 °F	1.06	1.055	1.05	1.04	1.03
Pounds per Gallon, 60 °F	8.82	8.78	8.74	8.66	8.58
Freezing Point, °F					
% aqueous sol by volume	-70	-56	-27	-6	10
pH of Solutions	N/A	10.5	10.5	10.5	10.5
Reserve Alkalinity (min)	10.0	5.0	5.0	5.0	5.0
Boiling Point, °F	320	225	222	219	216
Flash Point (PMCC), °F	225	None	None	None	None
Fire Point (COC), °F	220	None	None	None	None
Ash Content, Mass % (max)	5.0	2.5	2.5	2.5	2.5

INSTALLATION OF COMPLEAT™ HTF

When installing Compleat HTF products, it is important to determine the quality of the available water supply by analysis. Water with low total dissolved solids (TDS) is always recommended. If local water has low total dissolved solids, or if softened or demineralized water is available, it is acceptable to use Compleat HTF EG Concentrate or Compleat HTF PG Concentrate. If good water is not available locally, Compleat HTF EG Premix or HTF PG Premix products with demineralized water should be used to ensure that water quality requirements are met.

COOLANT SYSTEM PREPARATION

Before installing Compleat HTF EG or PG products, the coolant system should be completely drained and flushed with water. If rusting or scaling has occurred, the system should be chemically cleaned with Fleetguard Restore (alkaline chemistry for cleaning silica gelation) or with Restore Plus (acid chemistry for cleaning corrosion, rusting or scaling). Follow instructions for both Restore and Restore Plus as printed in their respective brochures.

Note: If the cooling system being treated contains a competitive product, an analysis of the fluid is recommended to determine its current condition, level of inhibition, and compatibility with the selected Compleat HTF product being used.

Whether a cooling system is cleaned for silica gel or rust and corrosion, it is important that all traces of chemical cleaning agents be completely drained and flushed with water before introducing new Compleat HTF products.

The procedure for installing Compleat HTF EG or PG products in in-line heaters generally will parallel those used in stationary engines or gen-sets.

COOLANT SYSTEM TESTING PROCEDURES

Cooling systems should be checked on a regular basis to determine freeze point, reserve alkalinity, pH, and corrosion inhibitor levels. Fleetguard offers coolant testing kits (CC2602) which can be used to do field spot checks for corrosion inhibitor levels, and refractometers (CC2806) to determine freeze protection of both Compleat HTF EG and PG products. Fleetguard's Quik-Check 3-Way Test Strips (CC2607) checks used coolant quality levels. This annual check tests for pH, Chloride, and Sulfate coolant condemnation levels.

It is recommended that coolant systems be sampled at least once per year and a full analysis performed. Fleetguard offers coolant analysis services through its Monitor C Program. Monitor-C Coolant Analysis bottles with mailers (CC2700) are available through your Fleetguard Compleat HTF Distributor.

COOLANT SYSTEM RE-INHIBITION

When analysis of coolant system samples indicates that re-inhibition is required, Fleetguard DCA4 Supplemental Coolant Additive (SCA) should be added to the system. DCA4 is a premium quality SCA which provides superior coolant system protection by adding required inhibitors to replace those depleted through use, and adds phosphates buffering agents to control corrosion and scaling. DCA4 Supplemental Coolant Chemical inhibitor is less toxic than other borate buffered inhibitors, and reduces the risk of SCA overcharging.

FREEZE POINT ADJUSTMENT

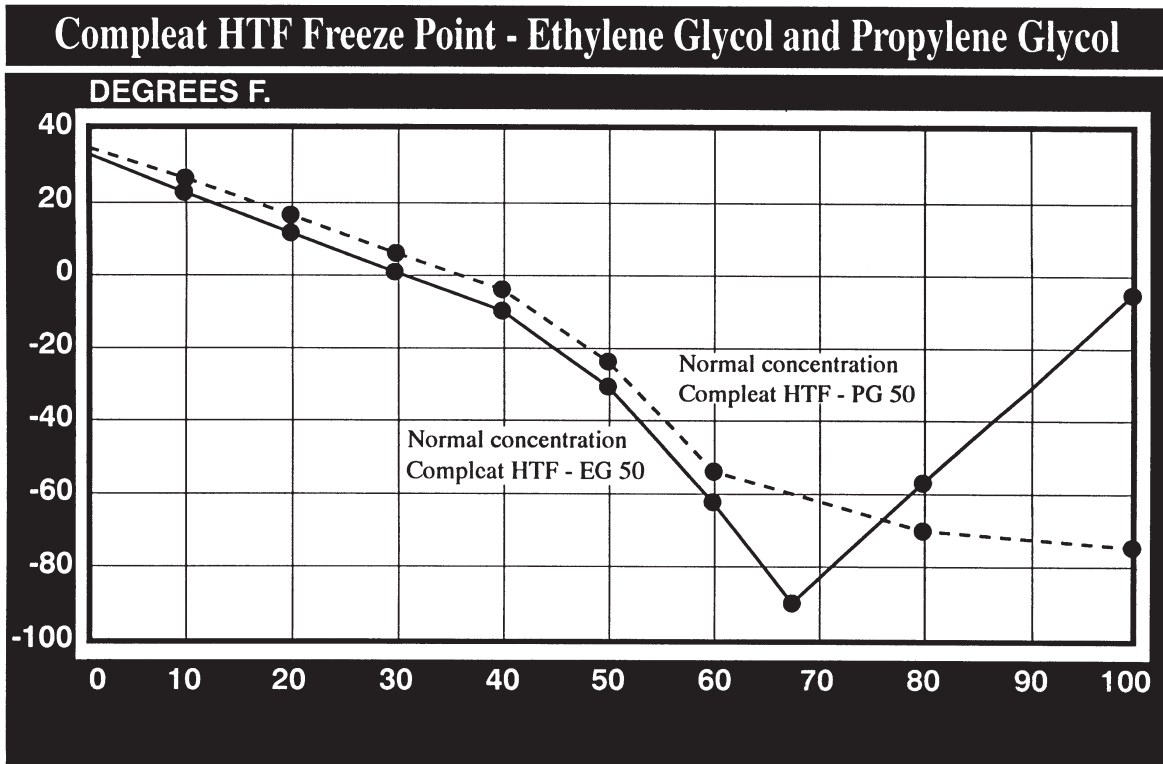
If a lower freezing point is required, the glycol concentration must be increased. Check the freeze point of the coolant system using a refractometer, and determine its capacity. Use the freeze point chart below to determine the approximate glycol concentration volume percent. The following formula should then be used to determine the amount of Compleat HTF Concentrate to be added to the system to achieve the desired freeze point. Drain the system of a portion of the coolant equal to the estimated required to adjust the freeze point. (Example below – 286 gallons required)

$$\text{Compleat HTF Concentrate to be added} = \frac{\text{Sys capacity gal} \times (\text{Desired Conc Vol\%} - \text{Present Conc Vol\%})}{100\% - \text{Present \% Concentration Vol \%}}$$

Example:	Present	Desired
Freeze Point (°F)	3	-34
Coolant Concentration Vol %	30	50

Therefore, using the above equation gives:

$$\text{Gallons of Compleat HTF Concentrate required} = \frac{1000 \text{ gal} \times (50\% - 30\%)}{100\% - 30\%} = 286 \text{ gallons required}$$



<u>ETHYLENE GLYCOL</u>	<u>GLYCOL % BY VOLUME</u>	<u>PROPYLENE GLYCOL</u>
4°F	30%	10°F
-10°F	40%	-6°F
-34°F	50%	-27°F
-65°F	60%	-56°F

Legend ——— EG - - - - - PG

COMPLEAT HTF EG AND PG TOXICITY

ETHYLENE GLYCOL

The toxicity threshold limit of any material per EPA regulations is:

5 GRAMS/KILOGRAM OF BODY WEIGHT

Toxicity is measured by feeding the material to rats and measuring the grams of the material per kilogram of the rat body weight required to kill 50% of the rats in the population eating the material. This number is referred to as the LD50 of the material. The lower the number, the more toxic the material.

Following are the LD50 values for various forms of Ethylene Glycol. These figures show that EG based coolants do exceed the toxicity threshold limits as set by EPA.

ETHYLENE GLYCOL	= 5.0 - 5.5 GR/KG
EG ANTIFREEZE CONCENTRATE	= 4.0 - 4.5 GR/KG
EG COMPLEAT CONCENTRATE	= 5.0 - 5.5 GR/KG

PROPYLENE GLYCOL

Compleat HTF PG Products contain Propylene Glycol which is low in oral toxicity, and has received a “generally recognized as safe” designation from the FDA. PG has been used for many years as an ingredient in food, cosmetics, and medicinal products. PG HTF products, due to their low toxicity, are often used in engines that are in or near food processing plants, or in truck cooling/heating systems that transport food products. Compleat PG Concentrate or Premix products present an advantage over EG products because of substantially lower human and animal toxicity.

Following are the LD50 values for various forms of Propylene Glycol. These figures show that PG based coolants do not exceed the toxicity threshold limits as set by EPA.

PROPYLENE GLYCOL	= 28.8 GR/KG
PG ANTIFREEZE CONCENTRATE	= 26.0 GR/KG
PG COMPLEAT CONCENTRATE	= 23.0 GR/KG

COMPLEAT HTF EG AND PG BIODEGRADABILITY

Heat Transfer Fluids, whether EG or PG, should never be dumped or spread into the environment, because either may contain hazardous contaminants, such as lead or benzene. However, if spilled into the environment accidentally, both EG and PG HTF products are fully biodegradable. While there are small differences in their rates of biodegradation, both biodegrade. It should be noted that cold temperatures cause rates of biodegradation for both EG and PG to slow or stop entirely, and that until fully biodegraded, EG presents a significant risk to pets, humans and wildlife. PG, however, is essentially non-toxic to animals and safer to the environment.

FLEETGUARD® COOLANT PRODUCTS

- **DCA4 Water Filters**
- **DCA4 Liquid Supplemental Coolant Additives**
- **Compleat HTF EG Concentrate and Premix**
- **Compleat HTF PG Concentrate and Premix**
- **Monitor C – Coolant Analysis Program**
- **3-Way SCA Test Strips**
- **Quik-Chek Coolant Quality Test Strips**
- **Refractometer – for EG and PG Coolant**
- **Restore Alkaline Based Cleaner**
- **Restore Plus Acid Based Cleaner**
- **Coolant System Training Programs**



For more information, call your Customer Assistance Representative at
1-800-22FILTER (1-800-223-4583), fax 1-800-999-8664 or
visit us at www.fleetguard.com