

ORISON

BioTherm Fluids® Automotive & Industrial

HEAVY DUTY / PRE-DILUTED

Non-Nitrite Glycerin AntiFreeze and Heat Transfer Fluid

DESCRIPTION

BioTherm Fluids® AI (Formerly IceClear HD) is a biobased, ready-to-use, glycerin based antifreeze / heat transfer fluid which combines highly refined glycerin meeting ASTM D7640 and a leading organic, NAP free, corrosion inhibitor package.

PERFORMANCE

BioTherm Fluids® AI meets the requirements of ASTM 7714 (Light Duty) and ASTM 7715 (Heavy Duty). Our non-nitrated organic corrosion package provides outstanding protection against pitting and corrosion of steel, copper, brass, solder, cast aluminum, and cast iron. AI lubricates pumps and valves, provides excellent scaling resistance, is compatible with typical gaskets, seals, elastomers and other non-metallic pump and engine parts (not recommended for use with CPVC), offers a freeze point of -31° F, and burst protection to -50° F.

SAFETY/ENVIRONMENT

BioTherm Fluids® AI was created for quality, safety and environmental concerns. AI is a certified USDA Biobased Product in the USDA BioPreferred® Program and is NSF listed (HT2). AI is readily biodegradable, non-toxic and non-hazardous. Glycerin is considered "GRAS", (Generally Recognized As Safe) by the FDA (Federal Food and Drug Administration).



APPLICATIONS

Designed for industrial and environmentally sensitive antifreeze, coolant/heat transfer and secondary refigerant applications, BioTherm Fluids® AI can be used in many gasoline, diesel and natural gas engines and non-automotive antifreeze / heat transfer applications.

FLUID TESTING

BioTherm Fluids® AI is a glycerin based product. Freeze point range and inhibitor concentrations can quickly be determined by testers available from Orison or more accurately by a refractometer (Brix). See page 2 for maintenance recommendations, chart showing Brix readings and freeze point. Do not use glycol testers to determine freeze point or inhibitor protection.

WHAT ABOUT MIXING FLUIDS

Use only BioTherm Fluids® AI in the system. This product is designed for those who desire to implement a green alternative and have complete control of the cooling systems, including top off. Although no negative effects are expected, mixing coolants/antifreeze is not recommended due to varying physical properties of the freeze point depressants and corrosion inhibitor technologies which leads to difficulties determining actual freeze point protection and corrosion inhibition.

ADVANTAGES

Biobased
Non-Toxic
NSF Listed
Non-Glycol
No Nitrites

No Silicone
No Molybdates
No Phosphates
Non-Hazardous
Non-Flammable
Lower BOD/COD

*(see maintenance directions on page 2)

NOTE:

The freeze point of the final coolant in the cooling system is determined by the extent of dilution of this product with any liquid remaining in the cooling system at the time of filling.

US Patents

One or more claims of US Patent No. 6,890,451 and 7,270,768.

Typical Properties

· Color	Orange Liquid
· Odor	Mild
· pH	7.5 - 9.5
· Specific Gravity	1.15
· Viscosity @ 20°C (cSt)	11.0
· Freeze Point	-31° F (-35° C)
· Boiling Point	228.2° F (109° C)
· VOC's	None Known

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MAINTENANCE DIRECTIONS

1. Use straight, DO NOT DILUTE.
2. Drain cooling system completely* and flush with a COOLING SYSTEM CLEANER to remove scale & rust build-up. Use only BioTherm Fluids® AI in the system and fill only after system has been completely drained and flushed. Do not mix with other coolants / anti-freeze / heat transfer fluids or chemicals.
3. Use only BioTherm AI in the system and fill only after system has been completely drained and flushed. Do not mix with other coolants / anti-freeze / heat transfer fluids or chemicals*.
4. Use ONLY CHEMICAL FREE FILTERS.
5. Check fluid level on regular maintenance schedule. Top off with only undiluted BioTherm Fluids® AI if system is low.
6. Test fluid for freeze point every 50,000 miles, 1500 hours or every 6 months, whichever comes first. Recommended to drain and recharge with new BioTherm Fluids® AI if Brix value is less than 37.0 as this indicates the product has been diluted more than 20%. Lab analysis is available through Orison.
7. Suggested to add NAP Free EXTENDER every 100,000 miles or 2500 hours whichever comes first.

The chart below is supplied as a guide for diagnostic / maintenance purposes. The values are calculated values and are only approximations. BioTherm Fluids® AI is ready-to-use and not to be diluted as the result would weaken the corrosion inhibitor package. Custom blending is available to meet specific physical properties such as freeze point and/or heat transfer capabilities.

BioTherm AI % / Spec. Grav.	Brix Value (Refractometer)	Freeze Point °F / °C	Boiling Point °F / °C	Specific Heat @ 35° F	Viscosity cSt @ 68° F (20° C)
100 / 1.155	46.5	-31° / -35°	228° / 109°	.74	10.8
90 / 1.139	42.1	-17° / -27°	225° / 107°	.77	7.9
80 / 1.123	37.5	-6° / -21°	222° / 106°	.81	5.5
70 / 1.106	33.1	2° / -17°	219° / 104°	.83	4.1
60 / 1.09	28.7	9° / -13°	218° / 103.5°	.85	3.2
50 / 1.07	24.1	15° / -9.5°	217° / 102.8°	.87	2.5

ANALYTICAL FROM ASTM D7715

ASTM D7715 specification covers the requirements for fully formulated coolants for cooling systems of Heavy Duty Engines and includes ASTM D7714 as a pre-requisite. ASTM D7714 specification covers the requirements for Automobile and Light-Duty Service.

ASTM D5931 Relative Density	ASTM D1121 Reserve Alkalinity
ASTM D1177 Freeze Point	ASTM D1881 Foaming Tendencies
ASTM D1120 Boiling Point	ASTM D2809 Cavitation Corrosion and Erosion-Corrosion Characteristics of Aluminum Pumps With Engine Coolants.
ASTM D1882 Auto Finish Effect	ASTM D4340 Corrosion of Cast Aluminum Alloys in Engine Coolants Under Heat-Rejecting Conditions
ASTM D1119 Ash Content	ASTM D1384 Corrosion Test for Engine Coolants in Glassware
ASTM D1287 pH	ASTM D2570 Simulated Service Corrosion Testing of Engine Coolants
ASTM D5827 Chloride	HSSR Scaling Resistance of Engine Coolants on Hot Steel Surfaces
ASTM D1123 Water Mass Percent	ASTM D5828 Compatibility with Supplemental Coolant Additive

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