ORISON

IceClear® HD

HEAVY DUTY / PRE-DILUTED
Non-Nitrite Glycerin AntiFreeze

DESCRIPTION
IceClear® HD is a patented biobased, ready-to-use, non-glycol antifreeze / heat transfer fluid which combines highly refined glycerin meeting ASTM D7640 and the industry leading NAP free corrosion inhibitor package.

PERFORMANCE
IceClear® HD meets the requirements of ASTM 7714 and ASTM 7715. Our state-of-the-art, non-nitrated corrosion package, provides outstanding protection against liner pitting and corrosion of steel, copper, brass, solder, cast aluminum, and cast iron. IceClear HD® lubricates pumps and valves, provides excellent scaling resistance, is fully compatible with gaskets, seals, elastomers and other non-metallic pump and engine parts, offers a freeze point of -31° F, and burst protection to -50° F. IceClear® HD provides protection up to a 350,000 + mile change interval in properly maintained engine systems.

SAFETY/ENVIRONMENT
IceClear® HD is the leader in quality, safety and environmental concerns. HD is a certified USDA Biobased Product in the USDA BioPreferred® Program and is NSF listed (HT2). IceClear HD is readily biodegradable, non-toxic, non-hazardous and has a neutral pH. Glycerin is considered "GRAS", (Generally Recognized As Safe) by the FDA (Federal Food and Drug Administration).

USDA CERTIFIED BIOBASED PRODUCT

APPLICATIONS
Designed for industrial and environmentally sensitive antifreeze, coolant/heat transfer and secondary refridgerant applications, IceClear® HD can be used in virtually all gasoline, diesel and natural gas engines and other applications such as:

- Fleet/Automotive
- Closed Loop Systems
- Solar Systems
- Floor Heating Systems
- HVAC
- Directional Drilling Fluid
- Hydrostatic/Pressure Testing
- Automatic Fire Sprinkler Systems

ADVANTAGES

Biobased	No Silicone
Non-Toxic	No Molybdates
NSF Listed	No Phosphates
Non-Glycol	Non-Hazardous
Neutral pH	Non-Flammable
No Nitrites	Lower BOD/COD

FLUID TESTING
IceClear® HD 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 IceClear HD® 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.

*(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 5,876,621; 5,980,774; 6,506,318; 6,890,451; 7,270,768 and issued and pending continuations thereof.

Typical Properties

· Color	Orange Liquid
· Odor	Mild
· pH	7.5 - 8.9
· 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

HMIS	
HEALTH	1
FLAMMABILITY	0
INSTABILITY	0
SPECIFIC	0

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MAINTENANCE DIRECTIONS

1. Use straight, DO NOT DILUTE.
2. Drain cooling system completely* and flush with HD COOLING SYSTEM CLEANER to remove scale & rust build-up. Use only IceClear® HD 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 IceClear® HD 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 IceClear® HD if system is low.
6. Test fluid for freeze point and inhibitor levels every 50,000 miles, 1500 hours or every 6 months, whichever comes first. Recommended to drain and recharge with new IceClear® HD if test strip shows to replace fluid or Brix value is less than 37.0 as this indicates the product has been diluted more than 20%. IceClear® HD lab analysis is available through Orison.
7. Add IceClear® HD EXTENDER every 100,000 miles, 2500 hours or if inhibitor level shows less than 7000ppm; whichever comes first.

The chart below is supplied as a guide for diagnostic / maintenance purposes. The values are calculated values and are only approximations. IceClear® HD 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.

IceClear® HD % / 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 D1122
Relative Density

ASTM D1177
Freeze Point

ASTM D1120
Boiling Point

ASTM D1882
Auto Finish Effect

ASTM D1119
Ash Content

ASTM D1287
pH

ASTM D5827
Chloride

ASTM D1123
Water Mass Percent

ASTM D1121
Reserve Alkalinity

ASTM D1881
Foaming Tendencies

ASTM D2809
Cavitation Corrosion and Erosion-Corrosion Characteristics of Aluminum Pumps With Engine Coolants.

ASTM D4340
Corrosion of Cast Aluminum Alloys in Engine Coolants Under Heat-Rejecting Conditions

ASTM D1384
Corrosion Test for Engine Coolants in Glassware

ASTM D2570
Simulated Service Corrosion Testing of Engine Coolants

HSSR
Scaling Resistance of Engine Coolants on Hot Steel Surfaces