



Envirotemp™ 360 fluid

Synthetic Ester Fluid

Product Description

Envirotemp 360 fluid is a less flammable dielectric liquid ideally suited for use in free-breathing transformers (both new and retrofill) and is also proven in traction transformers. Envirotemp 360 fluid has been thoroughly evaluated and conforms to IEC 61099 "Specifications for Unused Synthetic Organic Esters for Electrical Purposes."

Advantages

- The high fire point (315°C vs 160°C for mineral oil) allows its classification as a K-Class, less flammable liquid.
- It is a high thermal class dielectric liquid, suitable for use in free-breathing applications.
- It continues to flow even in extremely cold climates.
- Envirotemp 360 fluid is optimized for fire safety and oxidative stability. It surpasses the required performance of the oxidative stability test of synthetic ester liquids^a even when tested for as long as 500 hours.
- It is readily biodegradable according to OECD 301B and not classified as hazardous according to GHS.

Envirotemp™ 360 fluid values and specification units

PROPERTY	TEST METHOD	IEC 61099 PERMISSIBLE VALUES	TYPICAL
PHYSICAL			
Color	ISO 2211 ISO 2049	≤ 200 Hazen	≤ 100 Hazen 0.1
Appearance	Visually clear, free from water, suspended matter and sediment		
Density at 20°C (kg/dm ³)	ISO 3675, ISO 12185	≤ 1000	960
Kinematic viscosity (mm ² /s)	ISO 3104		
100°C		---	6
40°C		≤ 35	34
-20°C		≤ 3000	1700
Flash-point (°C)	ISO 2719	≥ 250	>283
Fire-point (°C)	ISO 2592	≥ 300	>315
Pour-point (°C)	ISO 3016	≤ -45	< -48
CHEMICAL			
Water content (mg/kg)	IEC 60814	≤ 200 ^b	≤ 50
Acidity (mg KOH/g)	IEC 62021 -1, IEC 62021 -2	≤ 0.03	0.01 – 0.02
OXIDATION STABILITY			
164 h @ 120°C	IEC 61125, Method C		
Total acidity (mg KOH/g)		≤ 0.3	0.13
Total sludge (% mass)		≤ 0.01	<0.01
ELECTRICAL			
Break down voltage (kV)	IEC 60156 ASTM D1816	≥ 45 ^b	68 59
Dielectric dissipation factor (tan δ) 90°C and 50 Hz	IEC 60247, IEC 61620	≤ 0.03 ^b	0.01
DC resistivity at 90°C (GΩ.m)	IEC 60247	≥ 2	60

^a IEC 61099 requires testing synthetic ester liquids according to IEC 61125 method C for 164h. Envirotemp 360 was approved when tested for 500h.

^b for untreated liquid, as received



Material Compatibility

Envirotemp™ 360 fluid is compatible with most materials used in conventional mineral oil filled transformers. Some restrictions may exist with materials such as PVC's, certain silicone rubber formulations, and polyurethanes. It is recommended to verify the chemical compatibility for each application.

Storage Location

Indoor tank storage is preferable. Since the fluid viscosity increases at low temperatures, indoor controlled temperatures reduce the need for heating the fluid to proper pumping and filtering temperatures.

For outdoor installations, a thermal insulating backfill should be considered for economic advantages. Despite having a low pour point temperature, increased fluid viscosity at low temperatures may make it difficult to handle.

Storage Temperature

Envirotemp 360 fluid can be pumped directly from storage tanks. If suction line lengths or suction lift heights are excessive, warming of the Envirotemp 360 fluid may be desired to reduce the viscosity.

If heating of Envirotemp 360 fluid is required, the following systems are recommended:

- A circulating pump and piping with a low watt density electric heater (in line) can be attached to the storage tank to maintain temperatures of 38°C (100°F) or higher (i.e., a 76 liter/min (20 GPM) pump with a 10 kW heater will maintain a temperature of 43°C (110°F) in a 19 m³ (5,000 gal) storage tank if heat losses to the environment are not excessive). The tank and piping should be insulated if ambient temperatures are low, to help minimize heating costs.

Tanks

Standard steel storage tanks conventionally used for transformer oil are satisfactory. Tanks should conform to local codes and standards. New tanks are preferred, should have at least one manhole, and should be protected from moisture by nitrogen blanketing. Before use, the inside of tanks should be sandblasted and primed with a coating compatible with synthetic ester fluid. Primers used for transformers' interiors are recommended. Existing storage tanks that have been used for conventional transformer oil can be used for Envirotemp 360 fluid if the following conditions are met:

- The tank is of proper capacity and the lines for filling and suction are adequate.
- The tank is thoroughly cleaned and inspected closely for any rusting condition or leakage.

Drum Handling Storage

- The Envirotemp 360 fluid-filled drums are sealed at the factory to protect against foreign material and moisture contamination during shipping. Seals over the bung plugs assure that the drum has not been opened.
- When drums of Envirotemp 360 fluid are to be stored, it is good practice to store them in a dry, temperature-controlled building. It is recommended the drum be stored horizontally with the bungs of the drum below the level of the fluid inside.
- A drip pan or basin is always recommended for drum storage.

CONTACT

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