



envirotemp™
ester dielectric fluids

Cargill Industrial Specialties

A GLOBAL PARTNER YOU CAN COUNT ON.

As an internationally recognized ester fluids expert and global supply chain manager, Cargill Industrial Specialties supplies dielectric fluids Envirotemp™ FR3™ natural ester and Envirotemp™ 200 synthetic ester fluids to utilities and transformer manufacturers around the world, providing unparalleled product quality, value and service.



Unparalleled expertise

The Envirotemp™ dielectric fluids team has a deep knowledge of natural and synthetic ester fluids as well as the technical and application expertise critical to scale solutions to any size of transformer for power, transmission and distribution in a range of applications. We collaboratively work with utilities to define, create and implement the right application solutions that achieve the performance and economic requirements specific to each individual organization's needs.

Proven performance

Envirotemp dielectric fluids are currently found in over one million power and distribution transformers worldwide. We have the technical and application expertise critical to scale solutions to any size of transformer for power, transmission and distribution in a range of applications.

Trusted, reliable local supply

With our global supply chain and robust manufacturing capabilities, our customers know they can rely on Cargill to deliver their dielectric fluid when they need it, anywhere in the world.



Creating business value

Our customers find that by partnering with Cargill they can positively impact their businesses in a variety of ways:

Increased grid reliability

- Extend insulation system and asset life
- Reduce maintenance and life cycle costs
- Increase load capacity
- Improve fire safety

Better manage costs with a more effective transformer system

- Reduce liability reserves and insurance premiums
- Optimize inventory management
- Reduce routine maintenance requirements
- Enhance sustainable supply chain initiatives

Minimize environmental impact

- Reduce carbon footprint
- Renewable, non-toxic, biodegradable options
- Simplify spill remediation

Envirotemp™ Dielectric Fluids

THE MOST RELIABLE WAY TO OPTIMIZE TRANSFORMER SYSTEMS.

Envirotemp fluids are designed for use in new transformers and for retro filling existing mineral oil transformers. These high performance fluids increase reliability, improve fire safety, extend insulation life and increase overload capacity. Available in both natural and synthetic ester formulations, Envirotemp fluids provide maximum application flexibility for both power and distribution transformers.

Increase grid safety and reliability

Providing a reliable, safe grid is a top priority for our customers. Since its introduction, there has not been a reported fire-related failure of an Envirotemp™ fluid filled transformer. Highlights include:

- Fire and flash points more than twice that of mineral oil
- Reduced clearances to buildings and equipment
- Classified by Underwriters Laboratories and FM Global as less flammable fluid
- Class K certification

Increase life and loadability

Insulation life is the number one factor that determines the life of a transformer. Because transformers filled with Envirotemp ester fluids can operate 20°C warmer than an equivalent mineral oil filled unit, capacity can be increased up to 20% while maintaining the same life expectation.*

This enables utilities to:

- Increase load on existing assets
- Extend life of insulation system and assets

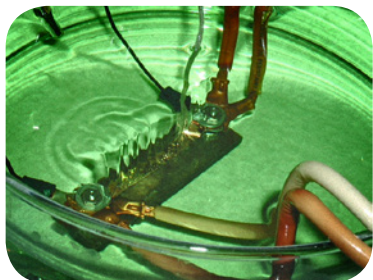
Reduce total cost impact

Envirotemp fluid can be used for both new and retro filled transformers to reduce operational costs, which could include:

- Eliminated need for costly fire mitigation and deluge systems
- Reduced remediation costs should spills occur
- Increased efficiency of existing assets due to increased loading capability
- Deferred replacement costs and reduced routine maintenance requirements
- Potentially reduced insurance premiums and liability reserves



*See IEEE C57.154™ Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperature



Envirotemp™ FR3™ fluid

THE NATURAL ESTER SOLUTION.

Envirotemp FR3 fluid is a natural ester fluid derived from 100% renewable vegetable oils – providing improved fire safety, transformer life/loadability and environmental benefits that are superior to mineral oil and unsurpassed by any other dielectric coolants.

- Twice the flash and fire point of mineral oil
- Ultimately biodegradable as designated by the EPA
- Carbon neutral*
- Non-toxic
- Contains no petroleum, halogens, silicones or sulfurs

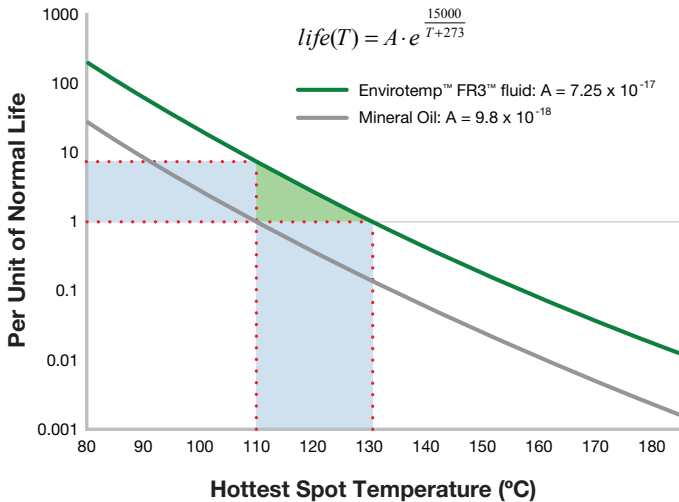
FR3 fluid has been used in distribution and power transformers through 420kV. Some of the largest utilities and transformer manufacturers around the world trust their power and distribution transformers with FR3 fluid.



*According to Building Environmental Economic Sustainability [BEES] lifecycle analysis

Optimize transformer performance and efficiency

Take advantage of the high temperature capability with transformers filled with FR3™ fluid by increasing load capability by up to 20% or extend asset life.



High temperature insulation capabilities

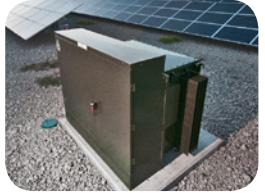
The common failure mode of an electrical transformer is caused by the degradation of the solid insulating system (cellulose paper). Subsequently, the (temperature) operating limits of a transformer are constrained by the thermal capabilities of the insulating materials within each design.

The typical reference point is the AWR (average winding rise) of the transformer – which is limited to 55°C and 65°C for mineral oil designs in standard and thermally upgraded Kraft (cellulose) paper, respectively.

However, as validated by standard accelerated testing methods, an insulating system with Envirotemp™ FR3™ fluid can operate 20°C warmer (than the mineral oil equivalent) while maintaining the same life expectation.*

This capability enables the design of smaller transformers (requiring “less cooling”) using less fluid, and construction materials that deliver the same or increased load capacity for use in both power and distribution transformers.

*See IEEE C57.154™ Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperature



Benefits to optimization

FR3 fluid high temperature insulation system capability provides significant benefits to utilities and transformer manufacturers by:

- Using up to 15% less fluid and 3% construction materials
- Increasing loadability up to 20% with current transformers
- Slowing asset replacement required
- Reducing routine maintenance
- Increasing reliability with decreased failure risk



Envirotemp™ 200 fluid

THE SYNTHETIC ESTER SOLUTION.

Envirotemp 200 synthetic ester fluid is a less flammable dielectric liquid ideally suited for use in free-breathing transformers (both new and retrofit) and is also proven in traction transformers. Envirotemp 200 fluid has been thoroughly evaluated and conforms to IEC 61099 “Specifications for Unused Synthetic Organic Esters for Electrical Purposes”.

Envirotemp 200 is a robust fluid that provides long-term stability even when exposed to extreme temperature variations. It also possesses excellent oxygen stability allowing it to be used in free breathing electrical equipment.

- Meets IEC, IEEE and IS standards
- Less flammable fluid (K class)
- More than twice the flash and fire point as mineral oil
- Superior moisture tolerance
- Excellent oxygen stability
- Readily biodegradable per OECD 301
- Non-hazardous in water and soil



Meeting the unique needs of our customers around the world.

Cargill is an international producer and marketer of food, agricultural, financial and industrial products and services. We are committed to delivering renewable industrial solutions and sharing our global experience to help meet the economic and environmental needs of our customers.

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