



MIDEL Regen

The world's first *regenerated* ester transformer fluid

K-Class - Readily Biodegradable - Extends Asset Life



Contact: midelsales@mimaterials.com

a product of  **M&I MATERIALS**



Circularity in Action

The World's First Regenerated Ester Transformer Fluid

MIDEL Regen is derived from in-service synthetic ester fluid which would otherwise be scheduled for disposal. It delivers the same MIDEL benefits of superior fire safety, environmental protection and improved transformer performance.

Since the 1970s MIDEL synthetic ester transformer fluid has been used in millions of assets worldwide, displacing mineral oil and PCBs with a safer, greener alternative.

We have used our 45+ years experience in developing esters to regenerate used MIDEL 7131 into MIDEL Regen, so it can be redeployed into the power industry.

This reinforces the growing adoption of, and preference for, MIDEL 7131. That the liquid can be regenerated at the end of its useful life gives owner/operators the added peace of mind of having selected the most sustainable insulating liquid for their transformer fleets.

A Positive Contributor to Sustainability

M&I Materials is committed to maximising its sustainability contributions both as an Ecovadis Silver organisation and through its products in respect to the UN Sustainable Development Goals.

MIDEL esters are positive contributors towards a number of UNSDGs through the displacement of harmful PCBs, mineral oil and SF₆ as a fire safe, environmentally friendly alternative. As a regenerated fluid, MIDEL Regen also allows transformer owner/operators to avoid incinerating or disposing of end of life synthetic ester from their ageing transformer fleets.

In partnership with transformer OEMs and Utility providers, MIDEL fluids are also widely accepted as enabling more sustainable substations and power networks, for example in renewables, rail, distribution and power applications. As Utility providers implement grid hardening and climate resiliency programmes, MIDEL is also widely specified as policy and in large power resiliency transformers. For more information, visit mimaterials.com/sustainability.



MIDEL Regen

Fluid Properties

MIDEL Regen meets the electrical and chemical performance parameters of IEC 61099, the standard for new synthetic ester transformer fluids.

Property	Test Method	MIDEL Regen
Physical		
Density at 20°C (kg/dm ³)	ISO 3675 or ISO 12185	0.97
Kinematic Viscosity (mm ² /sec)	ISO 3104	
at 40°C		29
at -20°C		1440
Flash Point PMCC (°C)	ISO 2719	> 250
Fire Point (°C)	ISO 2592	> 300
Pour Point (°C)	ISO 3016	-56
Crystallization	IEC 61099 (2010 Annex A)	No crystals
Biodegradation	OECD 301	Readily Biodegradable
Electrical		
Dielectric Breakdown (kV)	IEC 60156	> 75
Dissipation Factor at 90°C	IEC 60247	< 0.03
DC Resistivity at 90°C (GΩ.m)	IEC 60247	> 20
Chemical		
Water Content (mg/kg)	IEC 60814	< 200
Acidity (mg KOH/g)	IEC 62021-1 or IEC 62021-2	< 0.03
Oxidation Stability (164hr)	IEC 61125C	
Total Acidity (mg KOH/g)		< 0.03
Total Sludge (% mass)		< 0.01

Why MIDEL Regen?

A K-Class, biodegradable insulating fluid manufactured from regenerated synthetic ester liquids, reclaimed from end of life transformers.

The superior oxidation resistance over natural esters is what enables end of life synthetic ester to be regenerated into MIDEL Regen.

This can take place as assets are being decommissioned or at the end of the fluid's initial useful life. Using MIDEL Regen helps to make transformers even greener while also delivering:

INCREASED FIRE SAFETY

- K class - High fire point (>300°C)
- Meets the performance parameters of IEC 61039
- Suitable for indoor, outdoor and underground installations

GREATER ENVIRONMENTAL PROTECTION

- Readily and fully biodegradable
- Not detrimental to activated sludge in biological treatment plants
- Sustainable; Reclaimed from in-service transformers

IDEAL FOR TRANSFORMERS IN COLD CLIMATES

- Very low pour point: -56°C

EXTENDS TRANSFORMER LIFE

- Absorbs large amounts of moisture with no reduction of breakdown voltage (up to 600ppm)
- Allows moisture to migrate from cellulose into the fluid, thus extending cellulose life
- Very high saturation limit (2,700 ppm @ 20°C) making precipitation of free water virtually impossible

SYNTHETIC ESTER ADVANTAGES

- Superior oxygen stability to natural ester and mineral oils
- Flexible - suitable for non free-breathing and breathing systems
- High performance in cold climates

ENABLES INNOVATION

- Allows for compact transformer design
- Option to run at a higher temperature, for a standard lifetime
- Provides a higher power output, without the need for high temperature insulation

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MIDEL across the globe:

CORPORATE HQ/EUROPE

M&I Materials Ltd
Hibernia Way, Trafford Park
Manchester M32 0ZD
United Kingdom
+44 (0)161 864 5422
midelsales@mimaterials.com
midel.com

AUSTRALIA/NZ

+61 424 178 961
midelsales@mimaterials.com

CHINA

+86 (21) 2226 5068
midelsales@mimaterials.com

INDIA

+ 91 120 4096801
midelsales@mimaterials.com

INDONESIA

+ 62 811 8457 985
midelsales@mimaterials.com

SINGAPORE

+ 44 787 206 3617
midelsales@mimaterials.com

SOUTH AFRICA

+ 27 81 474 0033
midelsales@mimaterials.com

UNITED STATES

+1 (404) 900 9229
midelsales@mimaterials.com