MIDEL®
SAFETY INSIDE

MIDEL Selection Guide

The World's Leading Brand of Ester Transformer Fluids

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a product of M&I MATERIALS

All MIDEL fluids are proven up to 400kV

MIDEL protects life, property and the environment. It saves money while enabling innovation. It's MIDEL. It's safety inside.

Which MIDEL?
The MIDEL family of transformer fluids comprises MIDEL eN 1215, MIDEL eN 1204 and MIDEL 7131. The "eN" prefix denotes natural esters, which are formulated using renewable base oils from different seed crops, whilst MIDEL 7131 is a synthetic ester fluid. All MIDEL fluids are fully/readily biodegradable.

MIDEL eN 1215 is formulated from soybean oil. This product is a very cost effective general purpose fluid, ideally suited to non free-breathing distribution and power transformers for use in temperate climates or indoors.

MIDEL eN 1204 is formulated from rapeseed/canola oil. It has a pour point of -31°C, making it a better choice in cooler climates. It also has superior oxidation characteristics compared to soya ester fluids.

In common with ALL natural esters on the market, both MIDEL eN 1204 and MIDEL eN 1215 are best suited for use in non free-breathing equipment. MIDEL natural esters meet the IEC 62770 and IEEE C57.147 standards.

MIDEL 7131 is specifically formulated to be a fire safe, high performance fluid providing all the benefits of ester technology in an extremely robust formulation. It is the fluid of choice when the performance demands on the transformer are higher, especially if located in a cold climate (it has a pour point of -56°C) or when there is a risk of contact with air.

In addition to being suitable and widely used for distribution and power transformers, MIDEL 7131 is also ideal for high temperature, breathing type equipment. It has a long track record in demanding applications such as wind turbines and rolling stock, and is proven up to 433kV. MIDEL 7131 meets the IEC 61099 standard.

MIDEL 7131, MIDEL eN 1204 and MIDEL eN 1215 are all fully/readily biodegradable.

Global experience with ester fluids

With operations in the UK, USA, Europe, the Middle East, China, India and South Africa, MIDEL's reputation as a trusted, global brand continues to grow. With further innovations underway, MIDEL continues to spearhead the adoption and development of ester transformer fluids.

MIDEL's engineers and chemists have built close working relationships with end users and the major transformer manufacturers. They are also active in IEEE, ASTM, CIGRÉ and IEC working groups and regularly undertake extensive projects with industrial associations and academic bodies. Such depth of experience allows the MIDEL team to provide an unrivalled level of expert technical guidance.

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The data presented in this table are typical values. The product specifications are listed in the product brochures.

Property	Standard Test Methods		MIDEL eN 1215 (Soya)	MIDEL eN 1204 (Rapeseed/Canola)	MIDEL 7131 (Synthetic)	Mineral Oil
	ASTM	ISO/IEC				
Physical						
Colour	D1500		0.5	0.5	0.5	0.5
Flash Point PMCC (°C)	D93	ISO 2719	> 260	> 260	260	150
Flash Point COC (°C)	D92	ISO 2592	> 315	> 315	275	160
Fire Point (°C)	D92	ISO 2592	> 350	> 350	316	170
Net Calorific Value (MJ/kg)	D240-2		37.2	37.5	30.8	46.0
IEC Classification		IEC 61039	K2	K2	K3	O1
Pour Point (°C)	D97	ISO 3016	-18	-31	-56	-50
Density at 20°C (g/cm^3)		ISO 3675	0.92	0.92	0.97	0.88
Viscosity (mm^2/sec)	D445	ISO 3104				
@100°C			7.6	8.3	5.3	2.6
@40°C			32	37	29	8.7
@0°C			206	230	233	70
@-20 (°C)			Solid	1485	1440	400
Biodegradation - OECD 301			Fully/Readily Biodegradable	Fully/Readily Biodegradable	Fully/Readily Biodegradable	Non Biodegradable
Electrical						
Dielectric Breakdown (kV)	D877		≥ 30	≥ 30	47	43
Dielectric Breakdown (kV)						
1 mm gap	D1816		35	32	46	47
2 mm gap	D1816		55	58	71	65
2.5 mm gap		IEC 60156	> 75	> 75	> 75	>70
Gassing Tendency (µl/min)	D2300		-87.6	-93.6	+26.0	<+30.0
Dissipation Factor at 90°C		IEC 60247	< 0.03	< 0.03	< 0.008	<0.001
Chemical						
Corrosive Sulfur	D1275	IEC 62535	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive
Water Content (mg/kg)	D1533	IEC 60814	50	50	50	10
Acid Number (mg KOH/g)	D974	IEC 62021	≤ 0.04	≤ 0.04	< 0.03	≤ 0.01
PCB Content (mg/kg)	D4059		Not detectable	Not detectable	Not detectable	Not detectable

The displayed typical values are not to be identified as acceptance values.

MIDEL transformer fluids: choice, quality and proven performance since the 1970s.

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The MIDEL range of transformer fluids

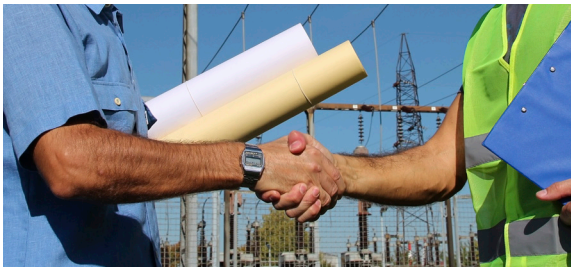
MIDEL has been leading the way in the development and deployment of ester-based transformer fluids since the 1970s. Selected by utilities and transformer manufacturers across the globe, MIDEL natural and synthetic ester fluids are acknowledged for their excellent fire safety and environmental protection properties, and their ability to extend the life of transformer cellulose insulation.

Is your transformer a piece of critical equipment? Is it located in a fire or environmentally sensitive location? What would be the consequence of asset failure? MIDEL's properties drive both installation savings as well as mitigating the risk of damage to life, property and the environment.

High fire point – delivering unsurpassed fire safety, saving on fire protection costs
Fully/Readily Biodegradable – protecting the environment and reducing containment costs
Low pour point – our synthetic ester is the premier fluid for colder climates
High moisture tolerance – extending cellulose insulation life and reducing overall total cost of ownership

Used in mainstream distribution and power transformers worldwide (MIDEL 7131 is proven up to 433kV), MIDEL transformer fluids enable transformer manufacturers to develop innovative transformer designs for specific applications or locations. Examples include smaller transformers or transformers able to operate at higher loading compared to mineral oil; delivering real benefits in traction transformers, wind turbine transformers and mobile power transformers. In addition, transformers can be run at higher temperatures, producing higher grade usable waste heat.

MIDEL – the leading brand of ester transformer fluids used in over 70% of countries worldwide.



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