[MIDEL®]
SAFETY INSIDE

MIDEL Selection Guide

Choosing the right transformer liquid for your application

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a product of M&I MATERIALS

MIDEL 7131 IS PROVEN UP TO 433kV

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 liquids 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.

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

MIDEL eN 1204 is formulated from rapeseed oil. It has a pour point around 13°C lower than the soy-based natural ester - making it a better choice in cooler climates.

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 7131 is specifically formulated to be a fire safe, high performance liquid which provides all the benefits of an ester-based liquid, but is also extremely robust. It is the liquid of choice when the performance demands on the transformer fluid are higher, especially if located in a cold climate 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, MIDEL eN 1204 and MIDEL eN 1215 are all 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 liquids.

MIDEL's engineers and chemists have built close working relationships with end users and the major transformer manufacturers. They are also active in IEEE, 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	MIDEL eN 1204	MIDEL 7131	Mineral Oil
	ASTM	ISO/IEC				
Physical						
Colour	D1500		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	232	233	70
@-20 (°C)			Solid	1485	1440	400
Biodegradation - OECD 301			Readily Biodegradable	Readily Biodegradable	Readily Biodegradable	Non Biodegradable
Electrical						
Dielectric Breakdown (kV)	D877		≥ 30	≥ 30	47	43
Dielectric Breakdown (kV)						
1 mm gap	D1816		30	45	46	47
2 mm gap	D1816		51	57	71	65
2.5 mm gap		IEC 60156	> 75	> 75	> 75	>70
Gassing Tendency (µl/min)	D2300		-31.9	-46.1	+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 62021.3	≤ 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 liquids: choice, quality and proven performance

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The MIDEL range of transformer liquids

MIDEL has been leading the way in the development and deployment of ester-based transformer liquids since the 1970s. Selected by utilities and transformer manufacturers across the globe, MIDEL synthetic and natural ester liquids 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
Biodegradable – protecting the environment and reducing containment costs
Low pour point – our synthetic ester is the premier liquid 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 liquids 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 natural and synthetic esters offer a game-changing alternative to conventional transformer oils.

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