



# MIDEL Selection Guide

Choosing the right transformer liquid for your application

Customer service: +1 770-817-9637 or [midelsales@mimaterials.com](mailto:midelsales@mimaterials.com)

a product of  M&I MATERIALS

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

### Which MIDEL?

MIDEL currently offers three types of transformer fluid; 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.

**MIDEL eN 1215** is formulated on soya-bean oil grown in the USA. This product provides a very cost effective general purpose liquid, ideally suited to sealed distribution and power transformers for use in temperate climates or indoors.

**MIDEL eN 1204** is formulated on canola oil. Midel eN 1204 has a pour point around 13°C lower than the soya-based natural esters - making it a better choice in cooler climates.

In common with ALL natural esters on the market, both MIDEL eN 1204 and MIDEL eN 1204 are best suited for use in sealed equipment.

**MIDEL 7131** is specifically formulated to be a fire safe, high performance fluid 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. MIDEL 7131 has a long track record in demanding applications such as wind turbines and rolling stock.

### Global experience with ester fluids

With the recent opening of operations in the United States, MIDEL's reputation as a trusted, global brand continues to grow. With further innovations to be announced, MIDEL continues to spearhead the adoption and development of ester transformer fluids.



**MIDEL 7131  
IS PROVEN UP  
TO 433kV**

## MIDEL Selection Guide

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

Property	Standard test methods		Typical Values			
	ASTM	ISO/IEC	MIDEL eN 1215	MIDEL eN 1204	MIDEL 7131	Mineral Oil
<b>Physical</b>						
Color	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 <sup>3</sup> )		ISO 3675	0.92	0.92	0.97	0.88
Viscosity (mm <sup>2</sup> /sec)	D445	ISO 3104				
@100°C			7.6	9.3	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 biodegradeable	readily biodegradeable	readily biodegradeable	non biodegradeable
<b>Electrical</b>						
Dielectric Breakdown (kV)	D877		≥30	≥30	47	43
Dielectric Breakdown (kV)						
1mm gap	D1816		30	45	46	47
2mm gap	D1816		51	57	71	65
2.5mm gap		IEC60156	>75	>75	>75	>70
Gassing Tendancy (µl/min)	D2300		-31.9	-46.1	+26.0	<+30.0
Dissipation Factor at 90°C		IEC60247	<0.03	<0.03	<0.008	<0.001
<b>Chemical</b>						
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 average values – not to be identified as acceptance values.

MIDEL transformer fluids: choice, quality and proven performance

## The MIDEL range of transformer fluids

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 fluids are acknowledged for their excellent fire safety and environmental protection properties, and their ability to extend the life of the transformer's 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 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 than with 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.



Any recommendation or suggestion relating to the use, storage, handling or properties of the products supplied by M&I Materials Ltd either in sales and technical literature or in response to a specific enquiry or otherwise is given in good faith, but it is for the customer to satisfy itself of the suitability of the product for its own particular purposes.

© M&I Materials 2016.

### MIDEL across the globe:

#### USA

M&I Materials Inc  
3675 Crestwood Parkway  
Ste 400  
Duluth GA 30096 USA  
T: +1 770 817 7637  
E: midelsales@mimaterials.com  
W: midelamericas.com

#### UK/Europe

M&I Materials Ltd  
Hibernia Way, Trafford Park  
Manchester M32 0ZD  
United Kingdom  
T: + 44 (0)161 864 5417  
E: midelsales@mimaterials.com  
W: midel.com

#### India

M&I Materials India Pvt Ltd  
Unit No. 504, 5th Floor, Elegance Tower  
Jasola District Center, Jasola  
New Delhi, 110 025  
India  
T: + 91 (0)11 6517 7114-16  
E: midelsales@mimaterials.com  
W: midel.com

#### China

M&I Materials Ltd  
8/F Yueda 889 Centre, No. 1111 Chang Shou Road  
Jing'an District  
Shanghai, 200042  
P.R. China  
T: +86 (21) 2230 1771  
E: midelsales@mimaterials.com  
W: midel.com