



Shell MIDEL eN 1204

Natural Ester (Rapeseed) Electrical Insulating Liquid, Fire Safe and Biodegradable

Shell MIDEL eN 1204 is a readily biodegradable, natural ester electrical insulating liquid. It is designed to provide an alternative to conventional mineral oil, silicone fluid and dry-type transformers. It offers robust low temperature performance and extended asset life.

Shell MIDEL eN 1204 has a high fire point, significantly increasing the fire safety of your transformers and reducing the need for fire protection equipment. It is also readily biodegradable, avoiding environmental damage should leakage occur and enabling simplifications in containment measures.

Technical Data Sheet

- Natural Ester Transformer Fluid (Rapeseed)
- IEC 62770, ASTM D6871 and IEC57.147
- Readily Biodegradable
- Fire Safe approved by FM Global and UL



DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

INCREASED FIRE SAFETY

- 100% fire safety record
- High fire point (>300°C) – K3 class classification
- Suitable for indoor, outdoor and underground installations

ENVIRONMENTAL PROTECTION

- Renewable vegetable oil
- Lower carbon footprint than conventional mineral oil
- Readily biodegradable
- Non-toxic
- No corrosive sulphur

SUPERIOR MOISTURE TOLERANCE

- Absorbs large amounts of moisture with no reduction of breakdown voltage (up to 300ppm)
- High saturation limit (1100ppm @20°C) making precipitation of free water virtually impossible

COLD CLIMATE OPERATION

-31°C pour point, performs better than soya ester

ASSET LIFE EXTENSION

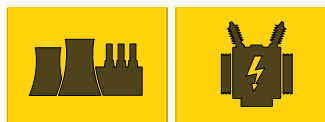
- Slower rate of cellulose ageing than conventional mineral oil
- Longer cellulose lifetime at standard temperatures
- Option to run at a higher temperature, for a standard lifetime
- Proven up to 420kV

- Provides a higher power output, without the need for high temperature insulation

ENABLES INNOVATION

- Allows for compact transformer design
- Permits greater flexibility and temporary overload resilience

Main Applications



Specifications, Approvals & Recommendations

- IEC 62770, ASTM D6871, IEEE C57.147
- IEC 61039: K2 classification
- UL approved
- FM Global Approved

Advice on applications not covered here may be obtained from your Shell or Shell Lubricants distributor representatives or technical helpdesks.

For full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Typical Physical Characteristics

Properties		Method ASTM	Method ISO/IEC	ASTM D6871	IEC 62770	Shell MIDEL eN 1204 Typical
Colour		ASTM D1500		≤1		0.5
Flash Point	°C	ASTM D92	ISO 2592	≥275		≥ 315
Fire Point (COC)	°C	ASTM D92	ISO 2592	≥300	≥300	≥ 350
Pour Point	°C	ASTM D97	ISO 3016	≤-10	≤-10	-31
Density	20°C kg/m ³		ISO 3675		≤1 000	920
Relative density	15°C	ASTM D1298		≤0.96		0.92
Kinematic Viscosity	100°C mm ² /s	ASTM D445	ISO 3104	≤15	≤15	8.3
Kinematic Viscosity	40°C mm ² /s		ISO 3104	≤50	≤50	37
Kinematic Viscosity	0°C mm ² /s		ISO 3104			230
Appearance		ASTM D1524		Bright and Clear		Bright and Clear
Appearance		Visual	IEC 62770 4.2.1		Clear, free from water and suspended matter and sediment	Clear, free from water and suspended matter and sediment
Biodegradability	%	OECD 301			Readily Biodegradable	Readily Biodegradable
Dielectric breakdown Voltage	kV	ASTM D877		≥30		≥ 30
Dielectric Breakdown Voltage as received@60 Hz, VDE, 1 mm gap	kV	ASTM D1816		≥20		32
Dielectric Breakdown Voltage @60 Hz, VDE, 2 mm gap	kV	ASTM D1816		≥35		58
Breakdown Voltage	kV		IEC 60156		≥35	≥ 75
Gassing Tendency	mm ³ /min	ASTM D2300		≤0		-93.6
Dielectric Dissipation Factor (Power Factor)	@25°C %	ASTM D924		≤0.2		≤ 0.2
Dielectric Dissipation Factor (Power Factor)	@100°C %	ASTM D924		4		≤ 4.0
Dielectric Dissipation Factor			IEC 60247		0.05	≤ 0.03
Corrosive Sulphur		ASTM D1275	IEC 62535	Non-corrosive	Non-corrosive	Non-corrosive
Water Content	mg/kg	ASTM D1533	IEC 60814	≤200	≤200	50
Acid Number	mg KOH/g	ASTM D974	IEC 62021.3	≤0.06	≤0.06	≤ 0.04
PCB Content	mg/kg	ASTM D4059		Not detectable		Not detectable
Oxidation Stability:						
Total Acidity	mg KOH/g		IEC 61125 C		≤0.6	≤ 0.1
Kinematic Viscosity	@40°C mm ² /s		ISO 3104		≤ 30% over initial	8%
Dielectric Dissipation Factor	@90°C		IEC 60247		≤0.5	≤ 0.1

These characteristics are typical of current production, variations in these characteristics in future production may occur.

Health, Safety & Environment

- **Health and Safety**

Shell MIDEL eN 1204 is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Shell MIDEL eN 1204 is free from polychlorinated biphenyls (PCB). Avoid contact with skin. Use impervious gloves with used liquid. After skin contact, wash immediately with soap and water.

Guidance on Health and Safety is available on the appropriate Safety Data Sheet, which can be obtained from <http://www.epc.shell.com>

- **Protect the Environment**

Take used liquid to an authorised collection point. Do not discharge into drains, soil or water.

Additional Information

- **Storage precautions**

The critical electrical properties of Shell MIDEL eN 1204 are easily compromised by trace contamination with foreign material. Typically encountered contaminants include moisture, particles, fibers, and surfactants. Therefore, it is imperative that electrical insulating liquids be kept clean and dry. It is strongly recommended that storage containers be dedicated for electrical service and include air-tight seals. It is further recommended that electrical insulating liquids are stored indoors in climate-controlled environments.