# Shell **MIDEL** *7131*

Technical Data Sheet

- Synthetic Ester Electrical Insulating Liquid
- Fire Resistant
- IEC 61039: K3 Classification, IEC 61099 and ASTM D8240

***Fire-Resistant Synthetic Ester Electrical Insulating Liquid***

Fire point >300°C (>572°F)

Shell MIDEL 7131 is a synthetic 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 7131 has a high fire point, significantly increasing the fire safety of your transformers and reducing the need for fire protection equipment. The ester base oil used in the formulation of Shell MIDEL 7131 is readily biodegradable according to OECD 301 test criteria, offering reduced impact of leaks or accidental spillage into aquatic environments compared to conventional mineral oils thanks to their higher biodegradability. (Publication EPA 800-R-11-002).

## DESIGNED TO MEET CHALLENGES

### Performance, Features & Benefits

#### SYNTHETIC ESTER ADVANTAGES

- Superior oxygen stability
- Flexible - used in non-free-breathing and breathing systems
- Proven up to 433kV
- High performance in cold climates

#### 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$^{0}$C) making precipitation of free water virtually impossible

#### INCREASED FIRE SAFETY

- 100% fire safety record
- High fire point (>300$^{0}$C) - K class classification
- K3 classification (IEC 61039)
- Suitable for indoor, outdoor and underground installations

#### LOWER ENVIRONMENTAL IMPACT

- The ester base oil used in the formulation of Shell MIDEL 7131 is readily biodegradable according to OECD 301 test criteria.
- Not detrimental to activated sludge in biological treatment plants.

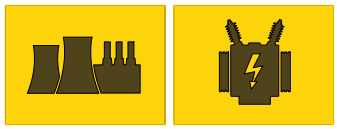
#### ENABLES INNOVATION

- 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

#### COLD TEMPERATURE OPERATION

- Very low pour point: -56$^{0}$C

### Main Applications



### Specifications, Approvals & Recommendations

- IEC 61099 and ASTM D8240 compliant
- IEC 61039: K3 classification.
- FM Global Approved
- UL approved

## Typical Physical Characteristics

| Properties | | | Method | IEC 61099 | Shell MIDEL 7131 Typical |
|---|---|---|---|---|---|
| Colour | | Hazen units | ISO 2211 | Max. 200 | 125 |
| Appearance | | | Visual | | Clear, free from water and suspended matter and sediment |
| Density | @20°C | kg/m³ | ISO 3675 | Max. 1 000 | 970 |
| Kinematic Viscosity | @40°C | mm²/s | ISO 3104 | Max. 35 | 29 |
| Kinematic Viscosity | @-20°C | mm²/s | ISO 3104 | Max. 3 000 | 1 440 |
| Flash Point | | °C | ISO 2719 | Min. 250 | 260 |
| Fire Point | | °C | ISO 2592 | Min. 300 | 316 |
| Pour Point | | °C | ISO 3016 | Max. -45 | -56 |
| Breakdown Voltage | | kV | IEC 60156 | Min. 45 | >75 |
| Volume Resistivity | @90°C | G Ohm m | IEC 60247 | Min. 2 | >20 |
| Water Content (Bulk) | | mg/kg | IEC 60814 | Max. 200 | 50 |
| Acidity / Neutralisation value | | mg KOH/g | IEC 62021-1 | Max. 0.03 | <0.03 |
| Oxidation Stability | | | IEC 61125C | | |
| Oxidation Stability (164 hrs) - Total Acidity | | mg KOH/g | IEC 61125C | Max. 0.3 | 0.02 |
| Oxidation Stability (164 hrs) - Sludge | | %m | IEC 61125C | Max. 0.01 | <0.01 |

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

## Health, Safety & Environment

- **Health and Safety**

  Shell MIDEL 7131 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 7131 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 7131 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.