

TECHNICAL DATA SHEET | INDUSTRIAL

# Engen Poweroil TO 1020 (60U)

*Uninhibited Transformer Oil*



Corrosion  
Protection



High  
Temperature



**PETRONAS**

Engen is a  
member of the  
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## Description

Poweroil TO 1020 (60U) is manufactured by Engen Petroleum LTD in South Africa, under license of APAR Industries LTD, to the IEC 60296:2020 – Edition 5.0 Standard Specification and is exclusively marketed in Southern Africa by Engen Petroleum Limited. They are high quality naphthenic base insulating oils with high di-electric strength, high chemical stability and very good water separating properties.

The expected life of transformer oil is 40 years or more. In order to meet this expectation, the oils have good chemical stability when exposed to elevated temperatures, which is essential to prevent the formation of acidic materials that impair the insulating properties of the oil. To carry out their cooling and insulating functions with a minimum power requirement when pumped, and to ensure most effective heat removal when circulated by thermal action, the oils have a low viscosity at operating temperature and good fluidity at low temperatures. Poweroil TO 1020 (60U) complies with the most recent tests and standards relating to the effects of corrosive Sulphur.

## Benefits & Features

- Extremely good heat transfer.
- Very good low temperature properties.
- High dielectric strength.

## Application

Poweroil TO 1020 (60U) is suitable for filling most types of transformers and switchgear. While the IEC Specification requires a minimum Electric Strength (breakdown voltage) of 30 kV, it recognises that oil in drums cannot be expected to retain the electric strength obtained at the time of filling. To ensure that the oil in service complies with the minimum requirements, it has a breakdown voltage exceeding 70 kV when filled into drums and IPS'. The drums are immediately inverted after filling to prevent breathing. Special care is needed in storage, when handling, and sampling and also in service to keep the oil clean and dry. Drums must be stored inverted, on a pallet, under cover and its storage time must be reduced to a minimum. IPS' are 900 liter foil lined bags that provide extended shelf life. Due to their unique characteristics, contamination of the oil is negated and BDV is protected even when part of the oil volume has been decanted. Transformer oil should preferably be filtered before being transferred into high voltage apparatus. It should not be transferred from one package to another. Aeration during filling must be prevented. All oil delivered in bulk is pumped into the trucks at a breakdown voltage in excess of 70 kV. Engen uses only transporters with a good track record and trucks dedicated to transporting transformer oil. All bulk trucks are tested for cleanliness prior to loading and are fitted with silica-gel breathers.

## Performance Level

Meets or exceeds the following Industry Standards:

- IEC 60296: 2020 – Edition 5.0 Standard Specification
- ASTM D1274B (Doble's modified Test requirement for corrosive sulphur)
- Eskom specification 240-75661431 (supersedes 32-406)
- NRS 079-1:2004
- SANS 555:2007



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## Typical Physical Characteristics

ENGEN POWEROIL TO 1020 (60U)				
PARAMETERS	METHODS	UNITS	GUARANTEED DATA MIN	GUARANTEED DATA MAX
Appearance	Visual inspection of oil sample in transmitted light under a thickness of 10cm at ambient temperature	-	Clear free from sediment and suspended matter	
Colour	ISO 2049 or ASTM D 1500	-	-	0.5
Density at 20 °C	ISO 3675 or IEC 12185	g/ml	-	0.888
Kinematic Viscosity at 40 °C at -30°C	ISO 3104	mm <sup>2</sup> /sec	11	1800
Flash Point, PMCC	ISO 2179 or ASTM D 93	°C	140	-
Pour Point, (typ)	ISO 3016 or ASTM D 97	°C	-	-45
Inter Facial Tension at 25 °C	ISO 6295 or ASTM D 71	mN/m	No general requirement (min 40)	
Acidity (Neutralisation Value)	IEC 62021-1	mg KOH/gm	-	0.01
Water Content at filling Bulk Drum	IEC 60814	mg/kg	-	<20 <40
Breakdown Voltage at filling (Dielectric Strength)	IEC 60156	kV	70	-
Dielectric Dissipation Factor (Tan d) at 90°C & 40 to 60 Hz	IEC 60247 or IEC 61620	-	-	0.005
Corrosive Sulphur a. Silver strip, 100 °C, 18 Hrs b. Copper strip, 150 °C, 48 Hrs	DIN 51353 & ASTM D 1275	-	-	Non-Corrosive Non-Corrosive
Potentially Corrosive Sulphur	IEC 62535	-	-	Not Corrosive
DBDS	IEC 62697-1	mg/kg	-	Not detectable
Antioxidant Additive	IEC 60666	%	-	(U) Uninhibited Oil- Not detectable



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## ENGEN POWEROIL TO 1020 (60U)

PARAMETERS	METHODS	UNITS	GUARANTEED DATA MIN	GUARANTEED DATA MAX
Metal Passivator	IEC 60666	mg/kg	-	Not detected
Oxidation Stability RPVOT	ASTM D 2112	Min	220	-
Oxidation Stability at 120 °C, (U) – 500 Hrs	IEC 61125 Method C	mg KOH / gm %	-	1.2
Total Acidity Sludge DDF at 90 °C	IEC 60247			0.8 0.5
Gassing Tendency	IEC 60628, ASTM D 2300	-	-	<5
PCA Content	BS 2000 Part 346	µ L min	-	3
PCB Content	IEC 61619	mg kg / gm	-	Not detectable
2-Furfural Content	IEC 61198	mg / kg	-	Not detectable
Aromatic Content	IEC 60590	%	6	14
Aniline Point	ASTM D 1611	°C	63	84
Silicone Content	ASTM D 6595	ppm	Not detectable	
Maximum Particle Contamination per 100ml	ISO Rating	-	17/14	

All technical data is provided for reference only. These characteristics are typical of current production. Whilst future production will conform to Engen's specification, variations in these characteristics may occur.

11.2021

## Health, Safety and Environment

This product is unlikely to present any significant health and safety hazards when used in the recommended application. Avoid contact with skin. Wash immediately with soap and water after skin contact. Do not discharge into drains, soil or water. For further detail regarding storage, safe handling, and disposal of product, please refer to product SDS.

Safety Data Sheets are available for all our products and should be only be consulted for appropriate information regarding storage, safe handling and disposal of the product. No responsibility shall be taken by either Engen or its subsidiaries and related holding corporation for any loss or injury or any direct, indirect, special, exemplary, consequential damages or any damages whatsoever, whether in action of contract, negligence or other tortious action, in connection or resulting from abnormal use of the materials and/or information, from any failure to adhere to recommendations, or from hazards inherent in the nature of the materials and/or information. All products, services and information supplied are under our standard conditions of sale.

Please consult with any of our local representative in the event you require any further information.



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