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## General specifications, Type B (uninhibited and inhibited standard grade oils)

Property	Test method	Limits	
		Transformer oil	Low temperature switchgear oils
1 – Function			
Viscosity at 40 °C	ISO 3104 <sup>a</sup> or ASTM D7042	Max. 12 mm <sup>2</sup> /s	Max. 3,5 mm <sup>2</sup> /s
Viscosity at -30 °C b	ISO 3104 <sup>a</sup> or ASTM D7042	Max. 1 800 mm <sup>2</sup> /s	
Viscosity at -40 °C c	IEC 61868		Max. 400 mm <sup>2</sup> /s
Pour point	ISO 3016	Max40 °C	Max60 °C
Water content	IEC 60814	Max. 30 mg/kg <sup>d</sup> / 40 mg/kg <sup>e</sup>	
Breakdown voltage	IEC 60156	Min. 30 kV / 70 kV <sup>f</sup>	
Density at 20 °C	ISO 12185 <sup>a</sup> or ISO 3675 or ASTM D7042	Max. 895 kg/m <sup>3</sup>	
DDF at 90 °C	IEC 60247 a or IEC 61620	Max. 0,005	
2 - Refining/stability			
Colour	ISO 2049	Max. 1,5	
Appearance		Clear, free from sediment and suspended matter	
Acidity	IEC 62021-2 <sup>a</sup> or 62021-1	Max. 0,01 mg KOH/g	
Interfacial tension	IEC 62961 <sup>a</sup> or ASTM D971	Min. 40 mN/m	
Corrosive sulphur	DIN 51353	Not corrosive	
Potentially corrosive sulphur	IEC 62535	Not corrosive	
DBDS	IEC 62697-1	Not detectable (< 5 mg/kg)	
Inhibitors of IEC 60666	IEC 60666	Uninhibited (U): not detectable (< 0,01 %)  Trace inhibited (T): ≥ 0,01 < 0,08%  Inhibited oil (I): 0,08 % to 0,40 %  (see 3.5 to 3.7)	
Metal passivator additives of IEC 60666	IEC 60666	Not detectable (< 5 mg/kg), or as agreed upon with the purchaser	
Other additives		See <sup>g</sup>	
2-furfural and related compounds content	IEC 61198	Not detectable (< 0,05 mg/kg) for each individual compound <sup>h</sup>	
3 – Performance			
Oxidation stability	IEC 61125	For oils with other antioxidant additives and metal passivator additives, see 6.12.2	
	Test duration '		
	(U) Uninhibited oil: 164 h		
	(T) Trace inhibited oil: 332 h		
	(I) Inhibited oil: 500 h		
<ul> <li>Total acidity j</li> </ul>	4.8.4 of IEC 61125:2018	max. 1,2 mg KOH/g	
– Sludge <sup>j</sup>	4.8.1 of IEC 61125:2018	max. 0,8 %	
– DDF at 90 °C j	4.8.5 of IEC 61125:2018	max. 0,500	
4 – Health, safety and envi	ronment (HSE) <sup>k</sup>		
Flash point	ISO 2719	Min. 135 °C	Min. 100 °C
PCA content <sup>l</sup>	IP 346	< 3 %	
PCB content	IEC 61619	Not detectable (< 2 mg/kg)	

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Stray gassing under thermo-oxidative stress (see 6.19) is not included as a normative test for mineral oils Type B, because there has been insufficient data to determine appropriate limits. The requirement for a stray gassing test, as well as the limit values, if stipulated, can be negotiated between the user and supplier.

- a Reference method.
- This is the standard LCSET for a transformer oil (see 6.1) and can be modified depending on the climatic condition of each country. Pour point should be minimum 10 °C below LCSET.
- <sup>c</sup> Standard LCSET for low temperature switchgear oil.
- for bulk supply.
- e For delivery in drums and IBC.
- After laboratory treatment (see 6.4).
- The supplier shall declare the function and chemical family of all additives (3.3), and the concentrations in the cases of inhibitors antioxidants and passivators (3.4).
- In agreement with the customer, oils with a higher furfural content can be delivered, when these values do not jeopardize the application.
- In some countries there can be lower requirements for oxidation stability.
- At the end of oxidation stability tests.
- k In some countries there can be additional requirements, e.g. REACH in the EU.
- Some individual PAH compounds can be determined by EN 16143.