ELECTRICAL OIL SERVICES
EOS® NTO X
Inhibited Electrical Insulating Oil

Description

Produced from selected virgin Naphthenic Feedstock, which fully meets the requirements of the International Standard IEC60296:2020 Ed.5 - Type A Classification TVAI general specifications and special applications and ASTM D3487-2016. The oil also fully meets the requirements of BS148:2020

Application

EOS® NTO products have a very low pour point, excellent oxidation stability and electrical properties making them suitable for the most demanding requirements set by leading global transformer manufacturers.

Table 3 - General specifications Type A (fully inhibited high grade oils)

Property	Test method	Limits	
		Transformer oil	Low temperature switchgear oils
1 – Function			
Viscosity at 40 °C	ISO 3104[a] or ASTM D7042	Max. 12 mm^2/s	Max. 3,5 mm^2/s
Viscosity at –30 °C [b]	ISO 3104[a] or ASTM D7042	Max. 1,800 mm^2/s	–
Viscosity at –40 °C [c]	IEC 61868	–	Max. 400 mm^2/s
Pour point	ISO 3016	Max. – 40 °C	Max. – 60 °C
Water content	IEC 60814	Max. 30 mg/kg [d]/ 40 mg/kg [e]	
Breakdown voltage	IEC 60156	Min. 30 kV / 70 kV [f]	
Density at 20 °C	ISO 12185 [a] or ISO 3675 or ASTM D7042	Max. 895 kg/m^3	
DDF at 90 °C	IEC 60247 [a] or IEC 61620	Max. 0,005	
2 – Refining/stability			
Colour	ISO 2049	L0,5 (less than 0,5)	
Appearance	–	Clear, free from sediment and suspended matter	
Acidity	IEC 62021-2[a] or 62021-1	Max. 0,01 mg KOH/g	
Interfacial tension	IEC 62961 [a] or ASTM D971	Min. 40 mN/m	
Total sulphur content	ISO 14596 [a] or ISO 8754	Max. 0,05%	
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	(I) Inhibited oil: 0,08 % to 0,40 % (see 3.7)	
Metal passivator additives of IEC 60666	IEC 60666	Not detectable (< 5 mg/kg), or as agreed upon with the purchaser	

Telephone: +44 (0) 845 602 1003 **Email:** EOS@h-c-s-group.com
Web: www.electricaloilservices.com
Electrical Oil Services, Bridges Road, Ellesmere Port, Cheshire, CH65 4EQ, UK
Registered Office: Haltermann Carless UK Ltd, Cedar Court, Guildford Road, Leatherhead, Surrey, KT22 9RX, UK
Registered in England and Wales No. 00429315

Other additives		See [g]	
2-furfural and related compounds content	IEC 61198	Not detectable (< 0,05 mg/kg) for each individual compound	
3 – Performance			
Oxidation stability	IEC 61125: Test duration (I) Inhibited oil: 500 h	For oils with other antioxidant additives and metal passivator additives, see 6.12.2	
– Total acidity [h]	4.8.4 of IEC 61125:2018	max. 0,3 mg KOH/g	
– Sludge [h]	4.8.1 of IEC 61125:2018	max. 0,05 %	
– DDF at 90 °C [h]	4.8.5 of IEC 61125:2018	max. 0,050	
4 – Health, safety and environment (HSE)[i]			
Flash point	ISO 2719	Min. 135 °C	Min. 100 °C
PCA content [j]	IP 346	< 3 %	
PCB content	IEC 61619	Not detectable (< 2 mg/kg)	

a Reference method.

b 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.

c Standard LCSET for low temperature switchgear oil.

d For bulk supply.

e For delivery in drums and IBC.

f After laboratory treatment (see 6.4).

g The supplier shall declare the chemical family and function of all additives (3.3), and the concentrations in the cases of inhibitors antioxidants and passivators (3.4).

h At the end of oxidation stability tests.

i In some countries there can be additional requirements, e.g. REACH in the EU.

j Some individual PAH compounds can be determined by EN 16143.

Telephone: +44 (0) 845 602 1003 **Email:** EOS@h-c-s-group.com
Web: www.electricaloilservices.com
Electrical Oil Services, Bridges Road, Ellesmere Port, Cheshire, CH65 4EQ, UK
Registered Office: Haltermann Carless UK Ltd, Cedar Court, Guildford Road, Leatherhead, Surrey, KT22 9RX, UK
Registered in England and Wales No. 00429315