NYNAS

PRODUCT DATA SHEET

NYTRO® LIBRA

Property	Unit	Test Method	Specification Limits Min	Max	Typical Data
1 - Function					
Viscosity, 40°C	mm^2/s (cSt)	ISO 3104		12	9.3
Viscosity, -30°C	mm^2/s (cSt)	ISO 3104		1800	1050
Pour point	°C	ISO 3016		-40	-51
Water content	mg/kg	IEC 60814		30	< 20
Breakdown voltage	kV	IEC 60156			
- Before treatment	kV	IEC 60156	30		40-60
- After treatment	kV	IEC 60296	70		> 70
Density, 20°C	kg/dm^3	ISO 12185		0.895	0.875
DDF at 90°C		IEC 60247		0.005	< 0.001
2 - Refining/stability					
Colour		ISO 2049		1.5	< 0.5
Appearance at 15°C		IEC 60296	Clear, Free from Sediment		Clear, Free from Sediment
Acidity	mg KOH/g	IEC 62021		0.01	< 0.01
Interfacial tension at 25°C	mN/m	IEC 62961	40		47
Corrosive sulphur		DIN 51353	Non-Corrosive		Non-Corrosive
Potentially corrosive sulphur		IEC 62535	Non-Corrosive		Non-Corrosive
Corrosive sulphur		ASTM D1275	Non-Corrosive		Non-Corrosive
DBDS	mg/kg	IEC 62697-1	Not Detectable		Not Detectable
Antioxidants	wt %	IEC 60666	Not Detectable		Not Detectable
Metal passivator additives	mg/kg	IEC 60666	Not Detectable		Not Detectable
Other additives *			None		None
2-Furfural and related compounds content	mg/kg	IEC 61198		< 0.05	< 0.05
Aromatic content	%	IEC 60590			9
3 - Performance					
Oxidation stability at 120°C, 164 h		IEC 61125			
- Total acidity	mg KOH/g	IEC 61125		1.2	0.7
- Sludge	wt %	IEC 61125		0.8	0.17
- DDF at 90°C		IEC 61125		0.500	0.041
4 - Health, safety and environment (HSE)					
Flash Point, PM	°C	ISO 2719	135		150
PCA	wt %	IP 346		< 3.0	< 3.0
PCB	mg/kg	IEC 61619	Not Detectable		Not Detectable

*this product contains no undeclared additives

NYTRO LIBRA is an uninhibited insulating oil meeting IEC 60296 Ed. 5 (2020) and is Type B, TVBU. Breakdown voltage after treatment as per definition in IEC 60296, section 6,4

Severely hydrotreated insulating oil

Issuing date: 28-12-2020

Table 4 – 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[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	Max. 1,5	
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	
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 [g]	
2-furfural and related compounds content	IEC 61198	Not detectable (< 0,05 mg/kg) for each individual compound[h]	
3 – Performance			
Oxidation stability	IEC 61125 Test duration [i] (U) Uninhibited oil: 164 h (T) Trace inhibited oil: 332 h (I) Inhibited oil: 500 h	For oils with other antioxidant additives and metal passivator additives, see 6.12.2	
– Total acidity [j]	4.8.4 of IEC 61125:2018	max. 1,2 mg KOH/g	
– Sludge [j]	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 environment (HSE)[k]			
Flash point	ISO 2719	Min. 135 °C	Min. 100 °C
PCA content[l]	IP 346	< 3 %	
PCB content	IEC 61619	Not detectable (< 2 mg/kg)	

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.

[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 function and chemical family of all additives (3.3), and the concentrations in the cases of inhibitors antioxidants and passivators (3.4).

[h] In agreement with the customer, oils with a higher furfural content can be delivered, when these values do not jeopardize the application.

[i] In some countries there can be lower requirements for oxidation stability.

[j] At the end of oxidation stability tests.

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

[l] Some individual PAH compounds can be determined by EN 16143.

7 Additional properties

7.1 General

Determination of properties such as electrostatic charging tendency, gassing tendency, thermal properties may be required for certain applications. Where required such measurements shall be performed according to a given standard and with specific limits, negotiated between supplier and user.

7.2 Electrostatic charging tendency (ECT)

ECT of oil is an important property for certain designs of high voltage (HV) and extra-high voltage (EHV) transformers which have oil pumping rates that can give rise to the build-up of electrostatic charge. This charge can result in energy discharge causing transformer failure.

NOTE A method to measure ECT is proposed by CIGRE Technical Brochure 170. It has been reported that ECT can be modified by using metal passivator additives such as BTA and TTA.

7.3 Gassing tendency

Gassing tendency describes oil capability to absorb or evolve gases when subjected to electrical stress and ionisation under specified laboratory conditions. A low gassing tendency is preferred by some users for special equipment such as HV instrument transformers and bushings. Gas absorption properties may be related to oil aromatic content. Gassing tendency shall be measured using Method A of IEC 60628:1985.

NOTE 1 Additives such as 1,2,3,4- tetrahydronaphtalene (tetralin), mono or dibenzyltoluene and others have been proposed to reduce the gassing tendency of some oils, but are not described in IEC 60666. Mono and dibenzyltoluene are described in IEC 60867.

NOTE 2 If requested by the purchaser, gassing tendency according to IEC 60628 can be agreed upon between the supplier and purchaser of the oil.