



Bio Transformer Oil

	Standard test methods		ASTM D6871/IEEE C57.147	IEC 62770	Bio Oil
PROPERTY	ASTM	ISO/IEC	As-received new fluid property requirements	Unused new fluid property requirements	TYPICAL
Physical					
Color	D1500	ISO 2211	≤1.0	-	0.5
Flash Point PMCC (°C)	D93	ISO 2719	_	≥250	260-270
Flash Point COC (°C)	D92	ISO 2592	≥275	_	320-330
Fire Point (°C)	D92	ISO 2592	≥300	>300	350-360
Pour Point (°C)	D97	ISO 3016	<-10	≤-10	-18 to -21
Density at 20°C (g/cm ³)		ISO 3675	_	≤1.0	0.92
Relative Density (Specific Gravity) 15°C	D1298	-	≤0.96	_	0.92
Viscosity (mm²/sec)				i i i i i i i i i i i i i i i i i i i	
100°C	D445	ISO 3104	≤15	≤15	7.7 - 8.3
40°C			≤50	≤50	32 - 34
0°0			≤500	-	190
-20°C					650*
Visual Examination	D1524	IEC 62770 4.2.1	bright and clear	clear, free from sediment and suspended matter	clear, light green
Biodegradation	OECD 301B		readily biodegradable	readily biodegradable	readily biodegradable
Aquatic and Oral Acute Toxicity	OECD 202, 203, OECD 420		non-toxic	non-toxic	non-toxic
Electrical					
Dielectric Breakdown (kV)	D877	_	≥30	_	>45
Dielectric Breakdown (kV)					
1mm gap	D1816	-	>20	-	>25
2mm gap	D1816	_	>35	-	>50
2.5mm gap	-	IEC 60156	_	≥35	>55
Dielectric Breakdown under Impulse (kV) 25.4mm gap	D3300		>130		140
Gassing Tendency (µl/min)	D2300	_	≤0	-	-79
Dissipation Factor			1	i i i i i i i i i i i i i i i i i i i	
25°C (%)	D924	-	≤0.20	-	0.010 - 0.15
90°C (tanδ)	-	IEC 60247	_	≤0.05	0.01 - 0.03
100°C (%)	D924	_	≤4.0	-	1.00 - 3.85
Chemical				i i i i i i i i i i i i i i i i i i i	
Corrosive Sulfur	D1275	IEC 62697	non-corrosive	non-corrosive	non-corrosive
Water Content (mg/kg)	D1533	IEC 60814	≤200	≤200	4 - 50
Acid Number (mg KOH/g)	D974	IEC 62021.3	≤0.06	≤0.06	0.01 - 0.05
PCB Content (mg/kg)	D4059	IEC 61619	not detectable	free from PCBs	not detectable
Total Additives		IEC 60666	_	Max weight fraction 5%	<2%
Oxidation Stability (48 hrs, 120°C)	-	IEC 61125 IEC 62770			
Total Acidity (mg KOH/g)	-	IEC 62621.3	-	≤0.6	0.1 - 0.3
Viscosity at 40°C (mm ² /sec)	-	ISO 3104		≤ 30% increase over initial	17% - 23% increase
Dissipation Factor at 90°C (tan δ)	_	IEC 60247	_	≤ 0.5	0.1
Oxidation Induction Time 130°C/500psi (min)	D6186**				62±2 min

* Measurement of viscosity near pour point may be inaccurate. ** A more specific version of the test indicated by ASTM D6186 is under development. NOTE: Specifications should be written referencing only the defined ASTM or IEC industry standard acceptance values and test methods. The listed 'typical' values are average values summarized from a significant number of data points over many years; they are not to be identified as acceptance values.

ASTM D6871 Standard Specification for Natural (Vegetable OII) Ester Fluids Used in Electrical Apparatus. IEC 62770: Fluids for electrotechnical applications – Unused natural esters liquids for transformers and similar electrical equipment. A transformer filled with Bio fluid complies with the transformer temperature operating range requirements defined in IEEE C57.12.00 and IEC 60076-1.

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