PSHVE/2022-23/1	**Product Specifications of Natural Ester Oil for Transformer Application**	Drg. No.	_____

1.0	**Application** To be used as Transformer oil as an insulating and cooling medium in oil-filled transformers.	**Vendor Compliance** (Yes/No)
2.0	**General** The transformer insulating fluid should be K2 class as specified in IS13503 as per table below and fully biodegradable as per IS13503	

Fire Point		Net Calorific value	
K	>300 °C	2	<42 MJ/kg

3.0 **Specifications:**

The basic parameter of the transformers fluid shall conform to IS:16659 as below:

Property	Permissible values
<u>Physical</u>	
Appearance	Clear free from water and suspended matter and sediment
Density at 20 °C (kg/m^3)	Max 1000
Kinematic viscosity at 40 °C (mm^2/s) at 100 °C (mm^2/s)	Max 50 Max 15
Flash Point (°C)	Min 250
Fire Point (°C)	Min 300
Pour point (°C)	Max-10

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		Vendor Compliance (Yes/No)
Chemical		
Water content (Mg/Kg)	Max 200 (Ref note 1)	
Corrosive Sulphur DBDS	Non Corrosive Below detection limit	
Soluble acidity (mg KOH/g)	Max 0.06	
Total additives (% mass)	Max 5	
Oxidation stability after 48 hrs @120°C		
Total acidity (mg KOH/g)	Max 0.6	
Viscosity at 40°C	Max 30% increase over the initial value	
DDF(Tanδ) at 90°C	Max 0.5	
Minutes of Oxidation Stability	Minimum >27 minutes to be tested with ASTM D2112 standard(RBOT test or equivalent)	
Electrical		
Break down voltage (2.5mm gap) 1)From drums 2)After treatment	1)Min 35 kV (refer note 1) 2)Min 70 kV	
Dielectric dissipation factor, tan Delta at 90 °C and 50 Hz	Max 0.05(refer note (1) and (2))	
Impulse Voltage at 25°C with 25.4mm gap	>130kVp	

Note (1) For untreated liquid as received

Note (2) For frequencies {f (Hz)} in the range of 48 Hz to 62 Hz convert values as follows

Tan delta [f (50 Hz)= f (Hz)/50 tan Delta [f(Hz)]

I/we hereby certify that Item being offered is COMPLIANT against the above specifications in all respects.

**Un-signed document will be treated as Non-Compliance to the requirement and will be rejected.