

Certificate of Analysis

Certificate No. : TC-6842

Sample Number : TO23-000546.004
Sampling Date : 29/12/2022
Product Name : Transformer Oil
Equipment ID : DL-31PTRGEM63468
Equipment Make : GEC
Equipment Serial No. : B-28238
Power Rating: 16 MVA
Voltage Rating: 33/11 kV
Sample Location: PTR-2,
 33 kV MASJID MOTH GRID
Year of Manufacturing: 1993
Sampling Point : Bottom
Sample Drawn By: SGS
Analysis Date 12/01/2023
ULR No.: TC68422300000

Customer address:
 BSES Rajdhani Power Ltd.,
 C-Block, BSES Bhawan,
 Nehru Place,
 New Delhi.

Temperature: 27°C
 Humidity: 47%

Discipline: Electrical
 Group: Liquid Dielectric Materials
 Transformer Oil

SGS Contact: M Naresh
 Phone : +91 22 61517831

COMMENTS

Note: Specification used:-

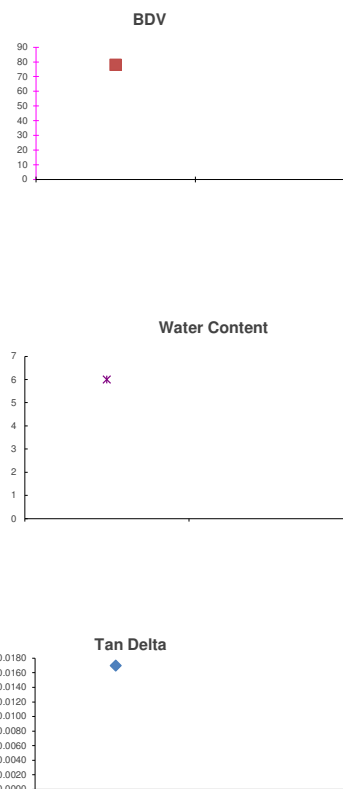
1. Transformer Oil Parameter - IS 1866-2000 for oil in service, IS 10593-2018 & IS 9434-2019 for DGA and IEC 61198-1993 for Furanic Compounds

Comments:-

- 1) Tested oil parameter results are within the limits & oil can be continued to use.
 2) Recommends to carry out full oil parameters annually as routine check.
 3) DGA test results indicates that presence of key gases.
 4) Recommends to carry out within a month to monitor rate of rise of individual gases.
 5) The furan analysis results indicates that health of insulating paper is satisfactory.
 6) The oil may be retested annually as routine check.

RESULTS

Sample Number	LIMITS		TO23-000546.004 29/12/2022
Parameters	IS 1866 < 72.5 kV		
Electric Strength (Breakdown Voltage) - IS 6792 Electrode gap 2.50 mm			
Electric Strength (Breakdown Voltage) - kV	Min. 30		78
Water Content - IS 13567			
Water Content, mg/kg	Max. 50		6
Flash Point - IS 1448 (P:21)			
Flash Point, °C	Min. 125		152
Interfacial Tension at 27°C - IS 6104			
Interfacial Tension at 27°C, mN/m	Min. 15		36
Dielectric Dissipation Factor (Tan delta) at 90°C - IS 6262			
Dielectric Dissipation Factor (Tan delta) at 90°C	Max. 1.0		0.0170
Specific Resistance (Resistivity) at 90°C - IS 6103			
Specific Resistance (Resistivity) at 90°C, Ω-cm	Min. 0.1 X 10 ¹²		7.914 X 10 ¹²
Neutralization Value (Total Acidity) - ASTM D974:2014			
Neutralization Value (Total Acidity), mgKOH/g Oil	Max. 0.3		0.010
Sediment & Sludge - IS 1866 - Annex. A			
Sediment & Sludge, % by wt.	Non Detectable		Not Detected
Dissolved Gases in Electrical Insulating Oil by GC- IS 10593-2018 and IS 9434-2019			
Hydrogen (H ₂), µl/l			1
Oxygen (O ₂), µl/l			14078
Nitrogen (N ₂), µl/l			31719
Methane (CH ₄), µl/l			45
Ethane (C ₂ H ₆), µl/l			99
Ethylene (C ₂ H ₄), µl/l			183
Acetylene (C ₂ H ₂), µl/l			BDL
Carbon Monoxide (CO), µl/l			21
Carbon Dioxide (CO ₂), µl/l			809
TDCG, µl/l			349
Furanic Compounds - IEC 61198-1993 Method A			
5-hydroxymethyl-2-furfural (SHMF), mg/kg			ND
2-furfurylalcohol (2FOL), mg/kg			ND
2-furfural (2FAL), mg/kg			0.13
2-acetylfuran (2ACF), mg/kg			ND
5-methyl-2-furfural (5MEF), mg/kg			ND
Total Furan compounds, mg/kg			0.13
ND-Not Detected			
BDL-Below Detection Level (BDL<1 µl/l)			



This report relates specifically to the sample tested as received. All tests have been performed using the latest revision of the methods indicated, unless specifically marked otherwise on the report. The latest available issue of the test methods in our possession has been used. Precision parameters apply in the determination of the above results. Users of the data shown on this report should refer to the latest published revisions of ASTM D-3244; IP 367; ISO 4259 and Appendix E of IP Standard Methods for Analysis and Testing when utilising the test data to determine conformance with any specification or process requirement. This report shall not be reproduced except in full, without the written approval of the laboratory.

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Authorised Signatory