



TNB LABS SDN. BHD. (979289-M)
(Formerly known as TNBR QATS Sdn. Bhd.)
MS ISO/IEC 17025 Accredited Laboratory



MS ISO/IEC 17025
TESTING
SAMM NO. 184

Certificate of Test

Job No. : TNBR-AC-32304-19-1065 **Job Status** : Complete
Client : TNB STESEN JANAKUASA SUNGAI PERAK
Region : Sungai Perak
Address : Bahagian Penjanaan, Beg Berkunci
No. 9 -, 33300 Gerik, Perak, Malaysia

Sample No. : AC-TXOIL-19-04039 **Certificate No.** : TNBR-AC-ECP001-19-04219

TRANSFORMER IDENTIFICATION

Site : SJ. BERSIA
TX No. : GT1
Serial No. : 571435
Mnemonic : BSIA GT1
Load MVA : 22.5/30
Voltages (KV) : 295/170.3
Maker : MITSUBISHI
Year Built : 1982
Job Remark : BSIA GT1
Sample Remark :

OIL SAMPLE DESCRIPTION

Sample Type : Oil
Sampling Point : Main Tank
Winding Temp.(°C) : -
Oil Temperature(°C) : B37
Sampling Date : 4/18/2019
Date Received : 4/26/2019
Test Date : 5/1/2019

Assessment : Normal DGA. Oil quality test shows acceptable value. Furan level is slightly decreasing from previous analysis done in July 2018. This oil is considered non-corrosive on copper (IEC Method).

Dissolved Gas Analysis : Concentration (ppm)			
Test	Result	Flag	Reference (Max)
Hydrogen (H ₂), ppm v/v	1	Normal	100 ppm
Oxygen (O ₂), ppm v/v	797	-	Not Specified
Nitrogen (N ₂), ppm v/v	3846	-	Not Specified
Methane (CH ₄), ppm v/v	1	Normal	120 ppm
Carbon Monoxide (CO), ppm v/v	4	Normal	350 ppm
Carbon Dioxide (CO ₂), ppm v/v	119	Normal	2500 ppm
Ethylene (C ₂ H ₄), ppm v/v	NIL	Normal	50 ppm
Ethane (C ₂ H ₆), ppm v/v	1	Normal	65 ppm
Acetylene (C ₂ H ₂), ppm v/v	NIL	Normal	1 ppm
Total Dissolved Combustible Gases (TDCG), ppm v/v	7		
Equipment: GAS CHROMATOGRAPHY (HP), Method: IEC 60567			Standard: IEEE C57.104 (Transformer)

Neutralization Value			
Test	Result	Flag	Reference (Max)
Neutralization Value (NV), mgKOH/g	0.037	Normal	0.2 mgKOH/g (Max)
Equipment: Autotitrator (Methrohm1), Method: IEC 62021-1			Standard: IEC 60422 (Used Oi) > 72.5 kV

Water Content			
Test	Result	Flag	Reference
Water Content (H ₂ O),mg/kg (ppm w/w)	6	Normal	10 ppm Max (corrected at 20 oC)
Equipment: Moisture meter metrohm, Method: IEC60814(1997)			Standard: IEC60422 (Used oil) > 170kV

Colour			
Test	Result	Flag	Reference
ASTM Colour	L2.0	Service aged oil	1.0 - 2.5
Equipment: OME 2000, Method: ASTM1500			Standard: ASTM (C Scale)

Dielectric Breakdown			
Test	Result	Flag	Reference
Dielectric Breakdown (BDV), kV	76	Normal	50 kV (Min)
Equipment: Megger BDV3, Method: -IEC 156:1995-			Standard: IEC 60422 (Used Oil) > 170 kV

Power Factor			
Test	Result	Flag	Reference
Power Factor	0.04495	Normal	0.2
Equipment: Eltel1, Method: IEC 60247 @ 90 Deg.C			Standard: IEC 60422 (Used Oil) > 170kV

Interfacial Tension Test			
Test	Result	Flag	Reference
Interfacial Tension (IFT), mN/m	26	Normal	22 mN/m Min
Equipment: Dataphysics, Method: ASTM D 971			Standard: IEC 60422 (Used Oil)

Furan			
Test	Result	Flag	Reference
2-furfurylalcohol (2FOL)	N/D		
5-hydroxymethyl-2-furfural (5HMF)	N/D		
2-furfural (2FAL)	711		
2-acetylfuran (2ACF)	N/D		
5-methylfuran (5MEF)	N/D		
Total of FURANS (ppb)	711	Normal	1000 ppb 2FAL Max
Estimated DP	474		
Estimated Life (%)	38		
Equipment: HPLC SHIMADSU, Method: IEC 1198			Standard: I.A.R Gray (Furan)

Potentially Copper Corrosive(IEC)		
Test	Result	Colour Reference
	Non-Corrosive	Negative (Dark Orange)
Equipment: Apparatus, Method: IEC 62535		

Disclaimer: The test results presented in this ACTMS Extranet relate only to the sample tested. This certificate report is not valid as an Official Test Certificate unless signed by an approved Issuing TNBR QATS Testing Laboratory. The authenticity of this Test Certificate and its contents can be verified by contacting the TNBR QATS, responsible for this Test Certificate.

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