

Sample No: 11509
Report Date: 2014-02-15

ANALYSIS REPORT

CLIENT ADDRESS

Company Name : REZILABS REPORT EXAMPLE
Contact Person : Mr. Ramsey Jadim
Mobile : +973 39904144

E-mail : ramsey.jadim@rezilabs.com
Address : P.O.Box 38257 Manama Bahrian
Tel./Fax : +973 77333391 / 77333392

EQUIPMENT DATA

Serial No : 000000-02
ID No :
Equipment Type :
Manufacture Name :
Manufacture Country :
Manufacture Year :
Station Name :
Location :
Operated Rate Power :
Owner :
Load :
Operating Period :
Phase No :
Tension, HV/LV: 33/6.9 kV
Oil Type :
Oil Weight :
Cooling Type :
Sealing System :
TC Type :
TC Chamber :

SAMPLING DATA

Sample Man Name :
Sampling Date/Time : 2014-02-07
Arrival Date : 2014-02-08
Sampling From :
Oil Temp :
Winding Temp :
Ambient Temp :
Ambient Humidity :
Reason for Sampling :
Unit In Operation? : YES

DISSOLVED GAS ANALYSIS (DGA)

Test Name	Value	Unit	Method	Normal	Caution	Date
Hydrogen(H2)	4.05	ppm(STP)	ASTM D3612C	<60	>150	
Oxygen(O2)	11994	ppm(STP)	ASTM D3612C	-	-	
Nitrogen (N2)	34717	ppm(STP)	ASTM D3612C	-	-	
Carbon Dioxide (CO2)	2498	ppm(STP)	ASTM D3612C	<5100	>13000	
Carbon Monoxide (CO)	351	ppm(STP)	ASTM D3612C	<540	>900	
Acetylene (C2H2)	<0.1	ppm(STP)	ASTM D3612C	<3	>50	
Ethylene (C2H4)	396	ppm(STP)	ASTM D3612C	<60	>280	
Ethane(C2H6)	323	ppm(STP)	ASTM D3612C	<50	>90	
Methane(CH4)	48	ppm(STP)	ASTM D3612C	<40	>110	
TCG (Total Combustible Gases)	1122	ppm(STP)	ASTM D3612C	<753	>1580	
CO2/CO	7.12	-	ASTM D3612C	-	-	
O2/N2	0.35	-	ASTM D3612C	-	-	
Equilibrium Gas Pressure @ 40 °C	451	hPa	In-house	< 1013	-	

Note 1: Value limit is used in accordance with standard IEC 60599 for mineral oil. Note 2: Head Space (HS) technique is used for extraction dissolved gases from oil.

EVALUATION

Extremely high amount of hot metal gases (ethylene and ethane) indicates thermal fault at high temperature. According to standard diagnostic methods, the transformer has a thermal fault over 700 °C. Source of overheating can be; hot spots in core, overheating of copper conductor from eddy currents, bad connection on winding or circulating currents in the tank and core (stray flux) or bad connection in the earth part. Insulating paper is not involved in this problem. No indication of high energy arcing due to low acetylene.


Ramsey Jadim
General Manager


Rahiyas Moideen
Quality Manager



This analysis result relates only to the specified product tested. Some values inside the brackets indicate for subcontracted parameters with other accredited lab.

Sample No: 11509
Report Date: 2014-02-15

OIL ANALYSIS

Test Name	Value	Unit	Method	Normal	Caution	Date
Acidity / Total Acid Number	0.04	mg KOH/g	IEC 62021-1	<0.15	>0.3	2014-02-09
Corrected Moisture Content @ 20°C	2.8	ppm	IEC 60422	<10	>25	2014-02-09
Measured Moisture Content KF	11.4	ppm	ASTM D1533	<35	-	2014-02-09
Saturation water in oil	5.5	%w	IEC60422	<5	>20	2014-02-09
Interfacial Surface Tension (IST)	34	mN/meter	ASTM D971	>28	<22	2014-02-10
Density of oil @ RT used for IST	0.87466	g/ml	ASTM D1217	-	-	2014-02-10
Density of Water @ RT used for IST	1.00150	g/ml	ASTM D1217	-	-	2014-02-10
Density of Oil @ 20 °C	0.87552	g/ml	ASTM D1217	-	>91000	2014-02-10
Breakdown Voltage (BDV)	71	kV/2.5 mm	IEC 60156	>40	<30	2014-02-09
Relative Std Deviation for BDV	9	%	IEC 60156			2014-02-09
Inhibitor Content (Antioxidant BHT)	0.30	%w	IEC 60666 / GC	0.35	-	2014-02-11
Dissipation Factor (DF) @ 90 °C/ 50Hz	0.003080	-	IEC 60247	<0.1	>0.5	2014-02-10
Resistivity (p) @90 °C/ 50Hz	254	G.ohm.m	IEC 60247	>3	<0.2	2014-02-10
Sediment & sludge	0.0003	%w	ASTM D1698	<0.02	-	2014-02-09
Colour	1.5	-	ASTM D1500	<2	-	2014-02-09
Corrosive Sulfur	Non Corr.	-	IEC 62535	-	-	2014-02-12
Appearance	Clear	-	ASTM D1524	-	-	2014-02-09
Dibenzyl Disulfide (DBDS)	0.2	ppm	IEC 62697-1	<10	-	2014-02-11
Metals Analysis	<0.1	ppm	ASTM D5185	-	-	2014-02-11
PCB Content	<0.1	ppm	IEC 61619	-	>2	2014-02-11
Particle Count (ISO Class)	13/10/8	Class	ISO 4406	-	>18/16/13	2014-02-11
Particle Count (NAS Class)	4	Class	NAS 1638	<7	8	2014-02-11
Furfural (5 Furanic Compounds)	0.07	ppm	IEC 61198 A	<2	>10	2014-02-10
Indirect Dp-Value	777	ppm	Calculated	-	-	2014-02-10
Flash Point	150	°C	ASTM D93	>145	-	2014-02-11

Note: Value limit is used in accordance with the standard ASTM D3487 and IEC 60422 for insulating oil in-service according to the Category "C" where the HV-system up to and including 72.5 kV.

EVALUATION

All oil analysis results are within normal level. There is no oxidation product in the oil such as acidity, sludge and water. Interfacial surface tension (IST), power factor and other oxidation parameters confirm no oxidation process. Breakdown voltage value indicates no contamination in the oil. No particles detected in the oil. Furfural value indicates normal condition of the insulating paper. No evidence of corrosive copper sulfide deposit, Cu₂S, inside transformer. The oil is inhibited with antioxidant BHT which can prevent oxidation in the oil. The oil is free PCB.


Ramsey Jadim
General Manager


Rahiyas Moideen
Quality Manager



This analysis result relates only to the specified product tested. Some values inside the brackets indicate for subcontracted parameters with other accredited lab.

RECOMMENDATION

New sample for DGA is recommended frequently to follow up gas trend. According to IEC 60599; "An increase in gas concentrations of more than 10% above typical concentration values per one month is generally considered a prerequisite for pronouncing the fault as active". However, this procedure is important to verify if overheating problem is ongoing or disappeared.


Ramsey Jadim
General Manager


Rahiyas Moideen
Quality Manager



This analysis result relates only to the specified product tested. Some values inside the brackets indicate for subcontracted parameters with other accredited lab.