



## Oil Analysis Report [OLXX03]

### Demo Company - All Modules

#### Site 1

Tag Number: PT4545

Wednesday, November 4, 2020

This report was prepared by TxMonitor® expressly for the customer as nominated on this page. Neither TxMonitor® nor any person acting in its behalf;

- a) makes any warranty, express or implied, with respect to the use of any information or methods disclosed in this report, or
- b) assumes any liability with respect to the use of any information or methods disclosed in this report.

Any recipient of this document, by their acceptance or use of this document, releases TxMonitor® and their affiliates from any liability for direct, indirect, consequential or special loss or damage whether arising in contract, warranty, express or implied, tort or otherwise, and irrespective of fault, negligence and strict liability.

Email copies of this report are not official unless authenticated and signed by TxMonitor® and are not to be modified in any manner without the express written consent of TxMonitor®.

TxMonitor® is responsible for all information in the report except that provided by the customer. Data provided by the customer is clearly identified. In addition, information supplied by the customer can affect the validity of the results. If the test sample deviates from specified conditions and is to proceed to testing, the results may be compromised.

Historical results from other laboratories provided by our Clients are included for reference and diagnosis purposes.

Accredited for compliance with ISO/IEC 17025 – Testing

Sampled in accordance with ASTM D923 - Sampling Electrical Insulating Liquids.

1300 736 091

[info@txmonitor.com](mailto:info@txmonitor.com)

[www.txmonitor.com](http://www.txmonitor.com)

TxMonitor, Unit 2/15 Hector Street (West), Osborne Park, WA 6017

NEWCASTLE • BRISBANE • DARWIN • PERTH • HAMILTON



# Oil Analysis Report

Report No.: OLXX03

Date: 04/Nov/2020

Client: Demo Company - All Modules

## Customer Details

**Customer:** Demo Company - All Modules **Contact:** Demo Admin **Email:** tobias.bloem@machinemonitor.com

## Asset Description

<b>Asset Tag:</b>	PT4545	<b>Serial No.:</b>	123456
<b>Site:</b>	Site 1	<b>Area:</b>	Substation 1
<b>Power Rating:</b>	17.50 MVA	<b>Voltage:</b>	132kV/11kV
<b>Oil Volume:</b>	1000L	<b>Insulation Fluid:</b>	Mineral Oil
<b>Manufacturer:</b>	Wilson	<b>Asset Class:</b>	Power Transformer
<b>Sampling Point:</b>	Bottom Valve	<b>Cooling:</b>	ODWF
		<b>YOM:</b>	1977

## TxAnalyser Assessment (This section is not part of the scope of NATA accreditation)

### IEEE DGA Interpretation Guidelines (C57.104)

Guideline	Result
-----------	--------

Hydrogen (PPM)	< 200	704
Methane (PPM)	< 200	500
Ethane (PPM)	< 250	500
Ethylene (PPM)	< 175	500
Acetylene (PPM)	< 4	25
Carbon Monoxide (PPM)	< 1100	99
Carbon Dioxide (PPM)	< 14000	990
Total Gas Volume (%)		2.315

### IEEE Oil Quality Interpretation Guidelines (C57.106)

Guideline	Result
-----------	--------

Acidity (mgKOH/g)	< 0.15
Colour	< 3.5
Water (PPM)	< 25
Interfacial Tension (mN/m)	> 30
Breakdown Voltage (Avg.kV)	> 47
Power Factor @ 25°C* (%)	< 0.5
Power Factor @ 100°C* (%)	< 5
PCB* (PPM)	< 2
Specific Gravity* (g/ml)	< 0.92

### Statement of Conformity

For a transformer of this age and voltage class.

0.02	Complies
<0.5	Complies
7	Complies
36	Complies
64	Complies
0.0	Complies
1.4	Complies
<1	Complies
0.89	Complies

## Comments

This sample is classified as DGA Status 3. Hydrogen, Methane, Ethane, Ethylene and Acetylene gas levels are exceedingly elevated.  
Exercise extreme caution. Plan outage.

Based on the 2FAL levels found in the sample, the estimated life remaining in the paper is 66%

## Diagnosis based on Gas Ratios:

CO2/CO ratio: Normal operation.

**Assessment:****Urgent****Next Sampling Date: 01/Feb/2021**

Additional interpretation of results are available on TxAnalyser

[Client Login](#)

### Assessment Code Legend

**Acceptable:** Asset is in a healthy/normal condition. The available data does not indicate an active fault mechanism.

**Caution:** Alert condition. There is an indication of an active fault mechanism in its early stages of development.

**Urgent:** Alarm condition. An active fault mechanism is highly likely and prompt attention to this asset is required.

Statements of conformity (e.g., Complies/Fails) to standard guidelines are made in this report without taking measurement uncertainty into account except when requested by the customer.

Where statements of conformity are made in this report, the following decision rules are applied:

Complies – Results are within standard guidelines

Fails – Results are outside the standard guidelines

TxMONITOR® - FIRST IN INDEPENDENT TRANSFORMER MANAGEMENT

Unit 2, 15 Hector Street (West), Osborne Park, WA, 6916. Tel: 1300 819 454



# Oil Analysis Report

Report No.: OLXX03

Date: 04/Nov/2020

Client: Demo Company - All Modules

**Analysis Results (cont. on Page 4)**

Sample Identification: Latest sample taken by TxMonitor/Machinemonitor

Sample Date	01/Nov/2020	24/Feb/2015	23/Jan/2011
Analysis Date	04/Nov/2020	28/Feb/2015	27/Jan/2011
Report Date	04/Nov/2020	04/Mar/2015	03/Feb/2011
Temp °C *	35	25	31
Laboratory	TxMonitor	TxMonitor	TxMonitor
Sample ID	TX0003	TX002	TX0001

**Dissolved Gas Analysis:** ± denotes MU

Method C - ppm at an STP of 0°C and 760 torr

ASTM-D3612	<b>Hydrogen (H<sub>2</sub>)</b>	<b>PPM (±14)</b>	704	450	350
ASTM-D3612	<b>Methane (CH<sub>4</sub>)</b>	<b>PPM (±13)</b>	500	250	174
ASTM-D3612	<b>Ethylene (C<sub>2</sub>H<sub>4</sub>)</b>	<b>PPM (±15)</b>	500	50	34
ASTM-D3612	<b>Ethane (C<sub>2</sub>H<sub>6</sub>)</b>	<b>PPM (±16)</b>	500	65	40
ASTM-D3612	<b>Acetylene (C<sub>2</sub>H<sub>2</sub>)</b>	<b>PPM (±16)</b>	25	25	5
ASTM-D3612	<b>Carbon Monoxide (CO)</b>	<b>PPM (±272)</b>	99	501	399
ASTM-D3612	Carbon Dioxide (CO <sub>2</sub> )	PPM (±1992)	990	600	2490
ASTM-D3612	Oxygen (O <sub>2</sub> )	PPM (±294)	600	200	150
ASTM-D3612	Nitrogen (N <sub>2</sub> )	PPM (±1105)	12,850	548	25
	<b>TDCG</b>	<b>PPM</b>	2,328	1,340	1,003

**Oil Quality Tests:** ± denotes MU

ASTM-D974	Acidity	mgKOH/g (±0.01)	0.02	0.01	0.01
ASTM-D1500	Colour	-	<0.5	<0.5	<0.5
ASTM-D1533	Water Content	PPM (±6)	7	5	6
ASTM-D971	Interfacial Tension	mN/m (±6)	36	36	35
AS1767-2.1	Breakdown Voltage	Avg.kV (±13)	64	65	62
ASTM-D1524	Visual Examination	-	Clear & Bright	Clear & Bright	Clear & Bright
ASTM-D924	Power Factor @ 25°C*	% (±0.01)	0.02	0.01	0.02
ASTM-D924	Power Factor @ 100°C*	% (±0.30)	1.40	1.20	1.30
	OQIN	-	1500	1500	1500

**Furanic Compounds:** ± denotes MU

ASTM-D5837	5-HMF	PPB (±10)	2	4	6
ASTM-D5837	2-FAL	PPB (±13)	634	360	482
ASTM-D5837	2-FOL	PPB (±7)	<5	<5	<5
ASTM-D5837	2-ACF	PPB (±4)	<8	<8	<8
ASTM-D5837	5-M2F	PPB (±5)	<3	<3	6
	Calculated D.P.	-	496	566	530
	Calculated Remaining Life	%	66	75	70

Signatory:

Report No.: OLXX03

Date: 04/Nov/2020

Client: Demo Company - All Modules

## Analysis Results (cont.)

Sample Identification: Latest sample taken by TxMonitor/Machinemonitor

Sample Date	01/Nov/2020	24/Feb/2015	23/Jan/2011
Analysis Date	04/Nov/2020	28/Feb/2015	27/Jan/2011
Report Date	04/Nov/2020	04/Mar/2015	03/Feb/2011
Temp °C *	35	25	31
Laboratory	TxMonitor	TxMonitor	TxMonitor
Sample ID	TX0003	TX002	TX0001

Special Tests: ± denotes MU

ASTM-D4243	Paper D.P.*^	-	350	900	875
EPA-8082	PCB*	PPM (±1)	<1	<1	<1
ASTM-D1298	Specific Gravity*	g/ml	0.89	0.89	0.89
ASTM-D1169	Resistivity @ 25°C*	Ω-cm (±6.5)	16.00	12.00	15.00
ASTM-D1169	Resistivity @ 100°C*	Ω-cm (±7.5)	20.00	18.00	15.00
ASTM-D2668	DBPC*^	%w/w (±0.05)	0.05	0.15	<0.05
ASTM-D2668	TIC*^	%w/w (±0.05)	0.05	0.15	<0.05
IEC-60296	IC Classification*^	-	Trace inhibited oil	Inhibited oil	Trace inhibited oil
ASTM-D5185	Silicone Content*^	PPM			

Particle Count:

ISO 4406	Particles*^	>4µm	600	1200	1500
ISO 4406	Particles*^	>6µm	52	100	132
ISO 4406	Particles*^	>21µm	20	56	85
ISO 4406	Particles*^	>38µm	2	5	12
ISO 4406	Particles*^	>70µm	1	2	<1
	ISO Code*^	-	15/12/8	16/13/10	20/15/12
	Cleanliness Code*^	-	Good	Good	Poor

(\*) Tests marked with this asterisk are not part of the scope of NATA accreditation.




(^\*) Tests marked with this symbol are performed by a NATA accredited third-party.

N/A Not Applicable

Signatory:



## Corrosive Sulphur per ASTM D1275B\* (This section is not part of the scope of NATA accreditation)

Details	Class	Description	Photo
Sample ID: TX0003 Date: 1/11/2020	Non Corrosive	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	
Sample ID: TX0002 Date: 24/02/2015	Corrosive	4c - Corrosion Glossy or Jet Black	
Sample ID: TX0001 Date: 23/01/2011	Non Corrosive	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	



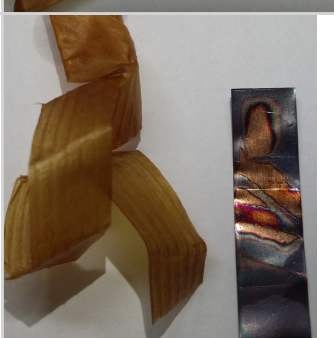
# Oil Analysis Report

Report No.: OLXX03

Date: 04/Nov/2020

Client: Demo Company - All Modules

**Corrosive Sulphur per IEC 62535\* (This section is not part of the scope of NATA accreditation)**

Details	Class	Paper Description	Copper Description	Photo
Sample ID: TX0003 Date: 1/11/2020	Non Corrosive	No deposits visible	1a - Slight Tarnish Light Orange, almost the same as freshly polished strip	
Sample ID: TX0002 Date: 24/02/2015	Non Corrosive	No deposits visible	4a - Corrosion Transparent Black, Dark Gray or Brown with Peacock Green barely showing	
Sample ID: TX0001 Date: 23/01/2011	Potentially Corrosive	No deposits visible	4b - Corrosion Graphite or lusterless Black	




# Oil Analysis Report

Report No.: OLXX03

Date: 04/Nov/2020

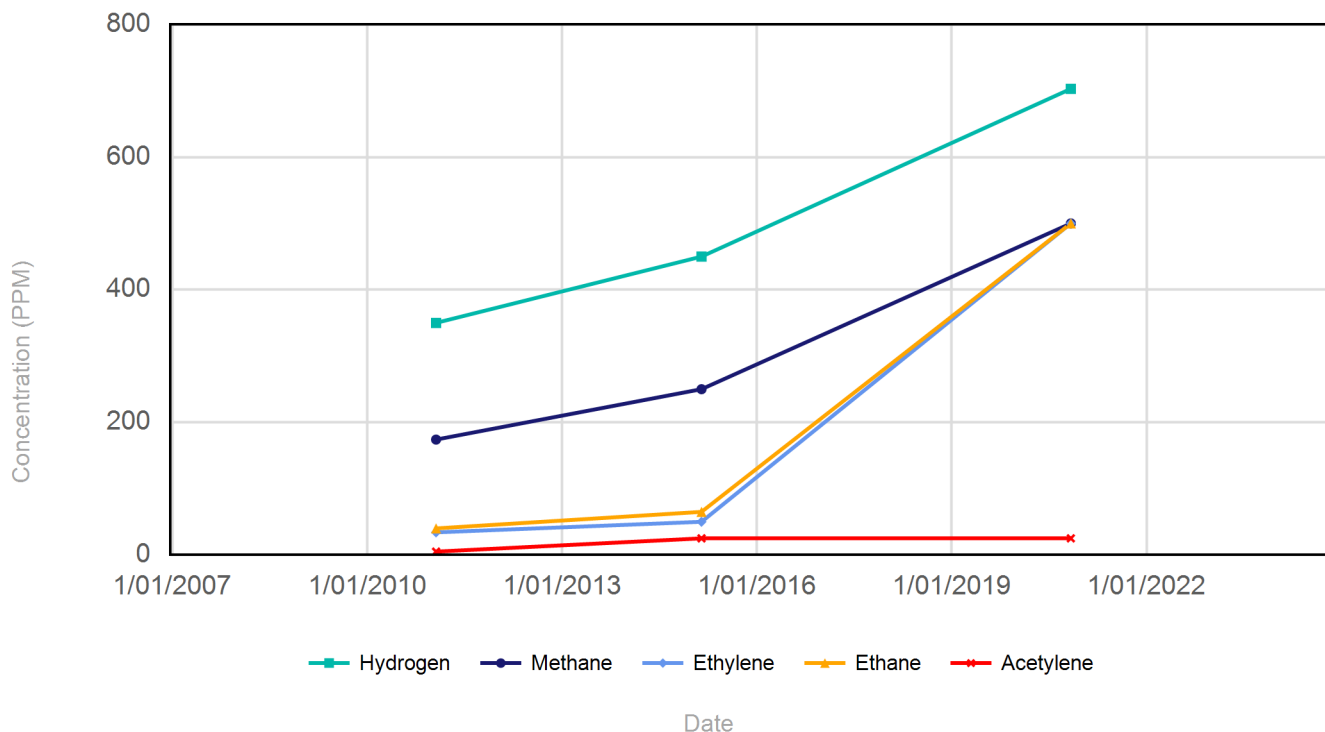
Client: Demo Company - All Modules

**Corrosive Sulphur per DIN 51353\* (This section is not part of the scope of NATA accreditation)**

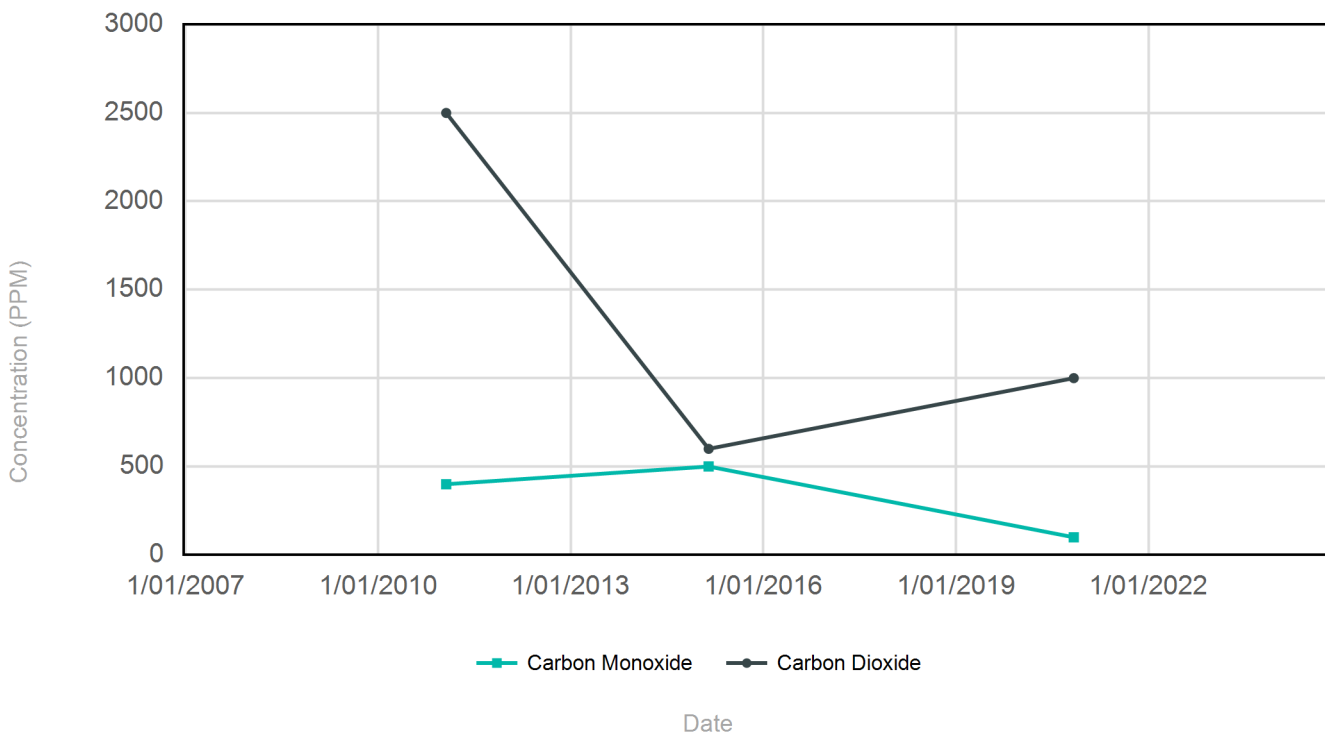
Details	Class	Photo
<p>Sample ID: TX0003</p> <p>Date: 1/11/2020</p>	Absent	
<p>Sample ID: TX002</p> <p>Date: 24/02/2015</p>	Present	
<p>Sample ID: TX0001</p> <p>Date: 23/01/2011</p>	Absent	

## Trend Charts (This section is not part of the scope of NATA accreditation)

### Dissolved Gas Analysis

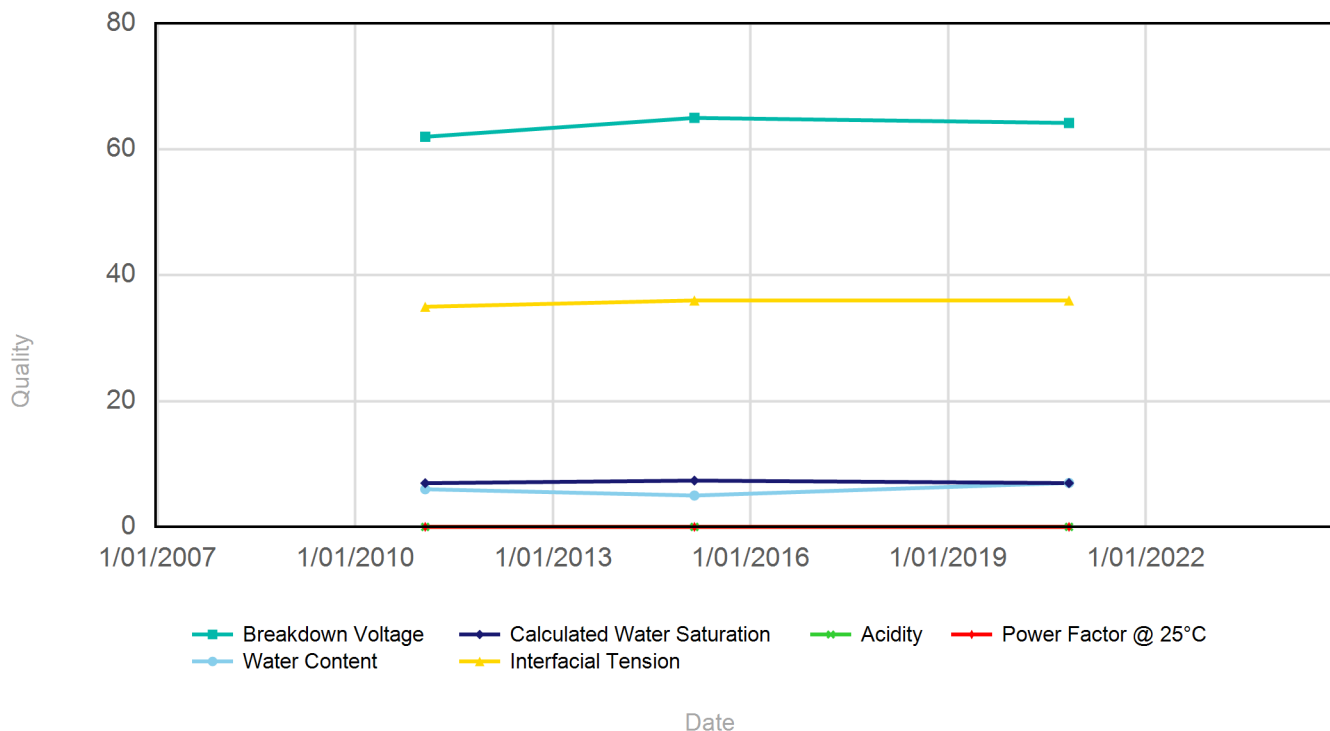


### Carbon Oxides

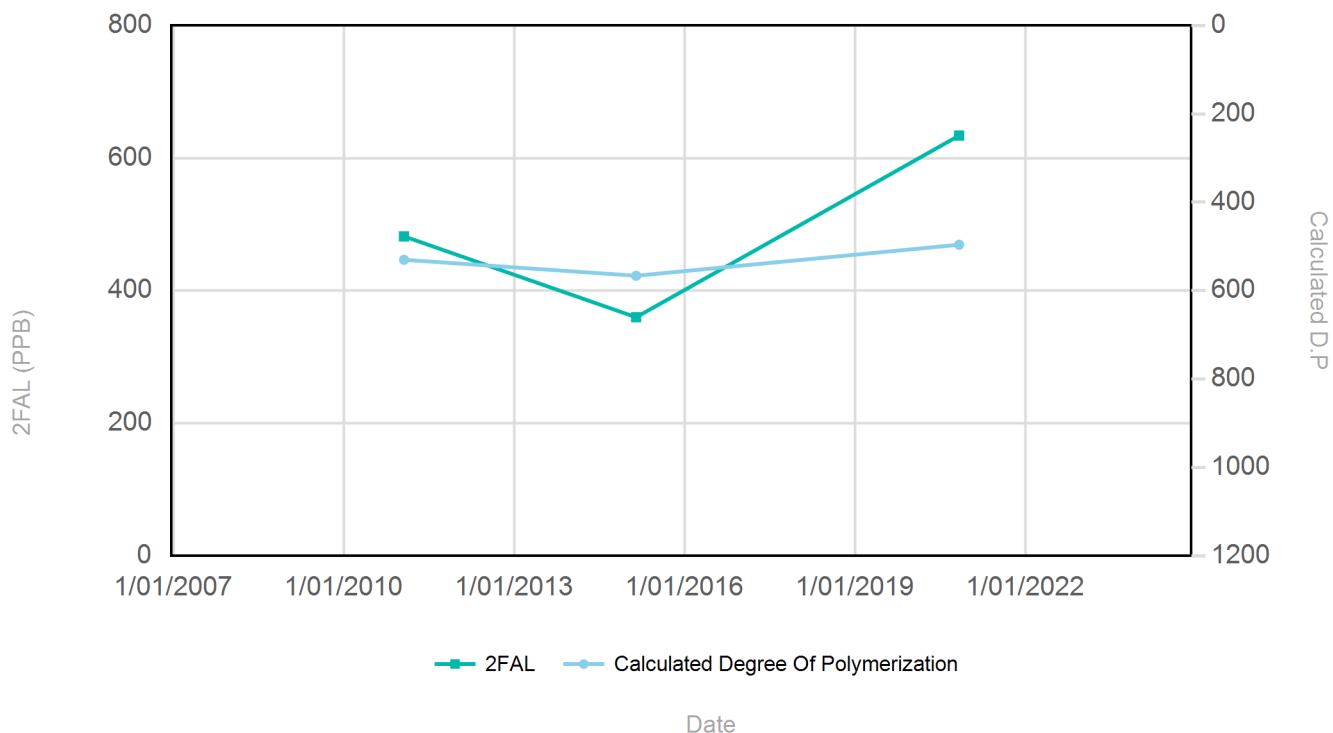




## Oil Quality



## Furanic Compounds





## Oil Analysis Report

Report No.: OLXX03

Date: 04/Nov/2020

Client: Demo Company - All Modules

### External Subcontractors (This section is not part of the scope of NATA accreditation)

Test	External Provider	Accreditation	Address
Particle Count	SGS Australia	NATA: 15506	28 Reid Rd., Perth Airport, WA 6105
Specific Gravity	Powerlink Queensland	NATA: 13401	33 Harold Street Virginia, QLD 4014
Degree of Polymerization	Ventia	IANZ: 4253	Gridco Rd., Gate 2, Otara, Otahuhu 1640, NZ
Inhibitor Content - DBPC (ASTM D2668)	SGS Australia	NATA: 15506	28 Reid Rd., Perth Airport, WA 6105

*This report shall not be reproduced except in full.*

**End of Report**