

OIL ANALYSIS REPORT

Area (YA156385) GFL035 Machine Id 810019 Component

Diesel Engine Fluid DIESEL ENGINE OIL SAE 15W40 (38 QTS)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

Wear

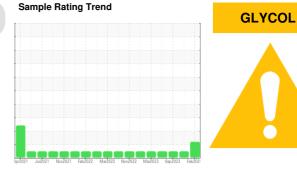
All component wear rates are normal.

Contamination

Sodium and/or potassium levels are high. Test for glycol is negative.

Fluid Condition

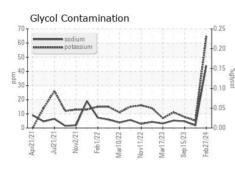
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

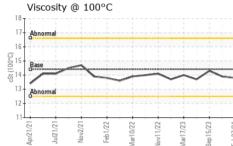


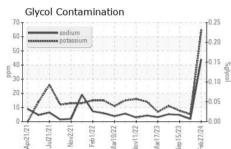
			Apr2021 Jul2	021 Nov2021 Feb2022	Mar2022 Nov2022 Mar2023 Sepi	2023 Feb202	
Sample Date Client Info 27 Feb 2024 02 Nov 2023 15 Sep 2023 Machine Age hrs Client Info 0 0 0 Oil Age hrs Client Info 600 600 600 600 Oil Changed Client Info Not Changed Changed Changed Changed Changed Changed Sample Status o method Imit/base current history1 Mistory2 Fuel WC Method >3.0 <1.0	SAMPLE INFORM	/ATION	method	limit/base	current	history1	history2
Machine Age OI AgehrsClient Info000OI Age Age All AgehrsClient Info600606006006006006006006006006006006006006006006006	Sample Number		Client Info		GFL0102349	GFL0085167	GFL0071618
Oil Age hrs Client Info 600 600 600 Oil Changed Client Info Not Changed Changed Changed Sample Status method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Sample Date		Client Info		27 Feb 2024	02 Nov 2023	15 Sep 2023
Oli Changed Client Info Not Changd ABNORMAL Changed NORMAL Changed NORMAL Changed NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Machine Age	hrs	Client Info		0	0	0
Sample Status Image of the status ABNORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Age	hrs	Client Info		600	600	600
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Not Changd	Changed	Changed
Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Wear WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >5 1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Sample Status				ABNORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 33 18 13 Chromium ppm ASTM D5185m >5 1 <1	CONTAMINATI	ON	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 33 18 13 Othromium ppm ASTM D5185m >5 1 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Inn ppm ASTM D5185m >75 33 18 13 Chromium ppm ASTM D5185m >5 1 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium ppm ASTM D5185m >5 1 <1 <1 <1 Nickel ppm ASTM D5185m >4 <1	WEAR METALS	S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >4 <1 <1 0 Titanium ppm ASTM D5185m >2 0 <1	Iron	ppm	ASTM D5185m	>75	33	18	13
Titanium ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 6 2 6 Lead ppm ASTM D5185m >25 <1	Chromium	ppm	ASTM D5185m	>5	1	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 6 2 6 Lead ppm ASTM D5185m >25 <1 <1 0 Copper ppm ASTM D5185m >25 <1 <1 0 Vanadium ppm ASTM D5185m >4 <1 0 0 0 Cadmium ppm ASTM D5185m >4 <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 100 63 62 80 Magnesium ppm ASTM D5185m 100 63 62 80 Calcium ppm ASTM D5185m 100 63 62 80 Calcium ppm ASTM D5185m 100 1112 885 1178 Calcium ppm ASTM D5185m 1350	Nickel	ppm	ASTM D5185m	>4	<1	<1	0
Aluminum ppm ASTM D5185m >15 6 2 6 Lead ppm ASTM D5185m >25 <1	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead ppm ASTM D5185m >25 <1 <1 0 Copper ppm ASTM D5185m >100 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >100 <1 2 1 Tin ppm ASTM D5185m >4 <1	Aluminum	ppm	ASTM D5185m	>15	6	2	6
Tin ppm ASTM D5185m >4 <1 <1 0 Vanadium ppm ASTM D5185m 0 <1	Lead	ppm	ASTM D5185m	>25	<1	<1	0
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 <1	Copper	ppm	ASTM D5185m	>100	<1	2	1
Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 5 5 4 Barium ppm ASTM D5185m 10 0 5 0 Molybdenum ppm ASTM D5185m 100 63 62 80 Magnesium ppm ASTM D5185m 100 63 62 80 Magnesium ppm ASTM D5185m 100 63 62 80 Calcium ppm ASTM D5185m 100 63 62 80 Calcium ppm ASTM D5185m 150 1112 885 1178 Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 1533 1206 1586 Sulfur ppm ASTM D5185m 25 8 7	Tin	ppm	ASTM D5185m	>4	<1	<1	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 5 5 4 Barium ppm ASTM D5185m 10 0 5 0 Molybdenum ppm ASTM D5185m 100 63 62 80 Magnesse ppm ASTM D5185m 100 63 62 80 Magnesium ppm ASTM D5185m 100 63 62 80 Calcium ppm ASTM D5185m 100 61 <1	Vanadium	ppm	ASTM D5185m		<1	0	0
Boron ppm ASTM D5185m 250 5 5 4 Barium ppm ASTM D5185m 10 0 5 0 Molybdenum ppm ASTM D5185m 100 633 62 80 Manganese ppm ASTM D5185m 100 633 62 80 Magnesium ppm ASTM D5185m 100 633 62 80 Magnesium ppm ASTM D5185m 100 613 1112 885 1178 Calcium ppm ASTM D5185m 450 11112 885 1280 Zinc ppm ASTM D5185m 1150 1041 1058 1280 Sulfur ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >158 44 2 5 Potassium ppm ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	<1	0
Barium ppm ASTM D5185m 10 0 5 0 Molybdenum ppm ASTM D5185m 100 63 62 80 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 450 1112 885 1178 Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >20 64 5 8 Glycol %6 *ASTM D2828 <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 100 63 62 80 Manganese ppm ASTM D5185m 450 1112 885 1178 Magnesium ppm ASTM D5185m 450 1112 885 1178 Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 1150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/m *ASTM D	Boron	ppm	ASTM D5185m	250	5	5	4
Manganese ppm ASTM D5185m <1 <1 <1 <1 Magnesium ppm ASTM D5185m 450 1112 885 1178 Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 1150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D7844 >6 0.6 0.7 0.4 INFRA-RED method limit/base current history1 history2 Soot % % <t< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td>10</td><th>0</th><td>5</td><td>0</td></t<>	Barium	ppm	ASTM D5185m	10	0	5	0
Magnesium ppm ASTM D5185m 450 1112 885 1178 Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 1150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >158 44 2 5 Potassium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/.1m *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method	Molybdenum	ppm	ASTM D5185m	100	63	62	80
Calcium ppm ASTM D5185m 3000 1311 1099 1344 Phosphorus ppm ASTM D5185m 1150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >158 44 2 5 Potassium ppm ASTM D5185m >20 644 5 8 Glycol % *ASTM D7842 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.tmm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.tmm	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 1041 1058 1280 Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >20 64 5 8 Potassium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D7844 >6 0.6 0.7 0.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/.tmm *ASTM D7624	Magnesium	ppm	ASTM D5185m	450	1112	885	1178
Zinc ppm ASTM D5185m 1350 1533 1206 1586 Sulfur ppm ASTM D5185m 4250 3390 3134 4230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >20 ▲ 64 5 8 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.tmm *ASTM D7415 >30 21.7 </td <td>Calcium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>3000</td> <th>1311</th> <td>1099</td> <td>1344</td>	Calcium	ppm	ASTM D5185m	3000	1311	1099	1344
SulfurppmASTM D5185m4250339031344230CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25878SodiumppmASTM D5185m>1584425PotassiumppmASTM D5185m>206458Glycol%*ASTM D2982MEGNEGNEGINFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.60.70.4NitrationAbs/cm*ASTM D7624>2010.18.36.7SulfationAbs/lim*ASTM D7415>3021.719.718.0FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.imm*ASTM D7414>2518.315.113.7	Phosphorus	ppm	ASTM D5185m	1150	1041	1058	1280
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m<>25878SodiumppmASTM D5185m>1584425PotassiumppmASTM D5185m>20▲ 6458Glycol%*ASTM D2982NEGNEGNEGINFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.60.70.4NitrationAbs/cm*ASTM D7624>2010.18.36.7SulfationAbs/.tm*ASTM D7415>3021.719.718.0FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.tm*ASTM D7414>2518.315.113.7	Zinc	ppm	ASTM D5185m	1350	1533	1206	1586
Silicon ppm ASTM D5185m >25 8 7 8 Sodium ppm ASTM D5185m >158 44 2 5 Potassium ppm ASTM D5185m >20 ▲ 64 5 8 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Sulfur	ppm	ASTM D5185m	4250	3390	3134	4230
Sodium ppm ASTM D5185m >158 44 2 5 Potassium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.imm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.imm *ASTM D7414 >25 18.3 15.1 13.7	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 64 5 8 Glycol % *ASTM D2982 NEG NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Silicon	ppm	ASTM D5185m	>25	8	7	8
Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Sodium	ppm	ASTM D5185m	>158	44	2	5
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Potassium	ppm	ASTM D5185m	>20	<u> </u>	5	8
Soot % % *ASTM D7844 >6 0.6 0.7 0.4 Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.1mm *ASTM D7615 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Glycol	%	*ASTM D2982		NEG	NEG	NEG
Nitration Abs/cm *ASTM D7624 >20 10.1 8.3 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7				limit/booo	current	history1	historv2
Sulfation Abs/.1mm *ASTM D7415 >30 21.7 19.7 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	INFRA-RED		method	IIIIII/Dase	ouriont	motory	
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7		%					
Oxidation Abs/.1mm *ASTM D7414 >25 18.3 15.1 13.7	Soot %		*ASTM D7844	>6	0.6	0.7	0.4
	Soot % Nitration	Abs/cm	*ASTM D7844 *ASTM D7624	>6 >20	0.6 10.1	0.7 8.3	0.4 6.7
	Soot % Nitration Sulfation	Abs/cm Abs/.1mm	*ASTM D7844 *ASTM D7624 *ASTM D7415	>6 >20 >30	0.6 10.1 21.7	0.7 8.3 19.7	0.4 6.7 18.0
	Soot % Nitration Sulfation FLUID DEGRAD	Abs/cm Abs/.1mm	*ASTM D7844 *ASTM D7624 *ASTM D7415 method	>6 >20 >30 limit/base	0.6 10.1 21.7 current	0.7 8.3 19.7 history1	0.4 6.7 18.0 history2



OIL ANALYSIS REPORT

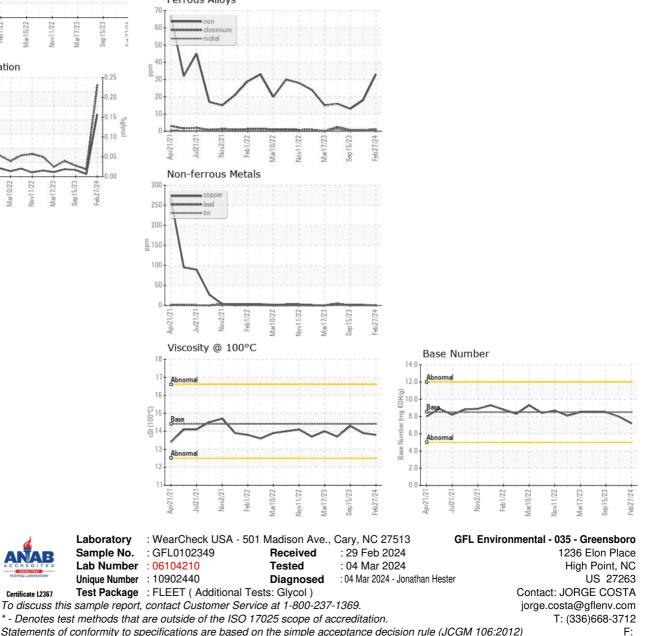






VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.8	13.9	14.3
GRAPHS						

Ferrous Alloys



Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Certificate L2367

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