

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



DIAGNOSIS Recommendation

Wear

oil.

Area (YA110701) Nachine Id VOLVO 2416 Component Diesel Engine

PETRO CANADA DURON SHP 15W40 (--- GAL)

Sample Date Client Info 11 Mar 2024 17 Jul 2023 11 Feb 2022 Machine Age mls Client Info 546906 368117 368117 Oil Age mls Client Info 0 24154 368117 Oil Changed Client Info N/A Changed N/A Sample Status Client Info N/A NoRMAL NORMAL CONTAMINATION method imit/base current history1 history1 Fuel WC Method >0.0 <1.0	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age mis Client Info 546906 368117 368117 Oil Age mis Client Info 0 24154 368117 Oil Ghanged Client Info N/A Changed N/A Sample Status Imit/base current history1 history2 Fuel WC Method >0.2 NEG NEG NEG Water WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG Chromium ppm ASTM 05165m >100 7 10 6 Chromium ppm ASTM 05165m >20 0 0 0 Nickel ppm ASTM 05165m >20 0 0 0 Aluminum ppm ASTM 05165m >21 <1	Sample Number		Client Info		GFL0111383	GFL0072226	GFL0046025
Oil Age mis Client Info 0 24154 368117 Oil Changed Client Info N/A Changed N/A Sample Status Imil/base current history1 history2 Fuel WC Method >6.0 <1.0	Sample Date		Client Info		11 Mar 2024	17 Jul 2023	11 Feb 2022
Oil Changed Sample Status Client Info N/A Changed NORMAL N/A CONTAMINATION method imit/base current history1 history2 Fuel WC Method >6.0 <1.0	Machine Age	mls	Client Info		546906	368117	368117
Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >6.0 <1.0	Oil Age	mls	Client Info		0	24154	368117
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >6.0 <1.0	Oil Changed		Client Info		N/A	Changed	N/A
Fuel WC Method >6.0 <1.0 3.8 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >20 <1	Sample Status				NORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imit/base current history1 history2 Iron ppm ASTM D5185m >100 7 10 6 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >25 2 5 2 2 Copper ppm ASTM D5185m >40 <1 <1 <1 <1 Antimony ppm ASTM D5185m >40 <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	CONTAMINAT	ION	method	limit/base	current	history1	history2
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imit/base current history1 history2 Iron ppm ASTM D5185m >100 7 10 6 Chromium ppm ASTM D5185m >20 <1	Fuel		WC Method	>6.0	<1.0	3.8	<1.0
Glycol WC Method NEG NEG NEG NEG WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >20 <1			WC Method	>0.2			NEG
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1				, 0.1			
Iron ppm ASTM D5185m >100 7 10 6 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 1 <1 <1 1 Copper ppm ASTM D5185m >15 <1 <1 <1 <1 Antimony ppm ASTM D5185m <1 <1 0	-	S		limit/base	-		
Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 <1							
Nickel ppm ASTM D5185m >2 <1 <1 <1 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >25 2 5 2 Lead ppm ASTM D5185m >330 1 2 2 Tin ppm ASTM D5185m >330 1 2 2 Antimony ppm ASTM D5185m >330 1 0 0 Vanadium ppm ASTM D5185m >15 <1	-				-		
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Lead ppm ASTM D5185m >40 <1 <1 <1 Copper ppm ASTM D5185m >330 1 2 2 Tin ppm ASTM D5185m >15 <1					-		
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Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 13 8 6 Barium ppm ASTM D5185m 0 0 0 0 0 Magnesium ppm ASTM D5185m 0 13 8 6 Magnesium ppm ASTM D5185m 0 13 8 6 Magnesium ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 0 <10 910 815 963 Calcium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 200 3103 </td <td></td> <td></td> <td></td> <td>>15</td> <th></th> <td></td> <td></td>				>15			
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Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 59 54 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 1 <1 Potassium ppm ASTM D7624	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 59 59 54 Manganese ppm ASTM D5185m 0 <1	Boron	ppm		·	13	8	6
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 <1	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 910 815 963 Calcium ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1150 982 918 1044 Zinc ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 -1 Potassium ppm ASTM D5185m >20 2 1 <1	Molybdenum	ppm	ASTM D5185m	60	59	59	54
Calcium ppm ASTM D5185m 1070 1043 1048 1103 Phosphorus ppm ASTM D5185m 1150 982 918 1044 Zinc ppm ASTM D5185m 1150 982 918 1044 Zinc ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 1 Potassium ppm ASTM D7844 >3 0.1 0.2 0.2 Soot % % *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION Method l	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 982 918 1044 Zinc ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 <1 Potassium ppm ASTM D5185m >20 2 1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >3 0.1 0.2 0.2 Nitration Abs/cm *ASTM D744 >3 0.1 0.2 0.2 Sulfation Abs/.1mm *ASTM D7415	Magnesium	ppm	ASTM D5185m	1010	910	815	963
Zinc ppm ASTM D5185m 1270 1167 1109 1191 Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 1 Potassium ppm ASTM D5185m >20 2 1 <1	Calcium	ppm	ASTM D5185m	1070	1043	1048	1103
Sulfur ppm ASTM D5185m 2060 3103 3103 2783 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >25 5 6 4 Potassium ppm ASTM D5185m >20 2 1 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.tmm *ASTM D7624 >20 5.4 8.8 7.2 CUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.tmm *ASTM D7614 >20 5.4 8.8 7.2 FLUID DEGRADATION method limi	Phosphorus	ppm	ASTM D5185m	1150	982	918	1044
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 2 1 1 Potassium ppm ASTM D5185m >20 2 1 <1	Zinc	ppm	ASTM D5185m	1270	1167	1109	1191
Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 22 2 1 1 Potassium ppm ASTM D5185m >20 2 1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 5.4 8.8 7.2 Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.1mm *ASTM D7615 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7614 >25 13.5 16.8 16.2	Sulfur	ppm	ASTM D5185m	2060	3103	3103	2783
Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m<>20 2 1 <1	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 2 1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Silicon	ppm	ASTM D5185m	>25	5		4
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Sodium	ppm	ASTM D5185m		2	2	1
Soot % % *ASTM D7844 >3 0.1 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Potassium	ppm	ASTM D5185m	>20	2	1	<1
Nitration Abs/cm *ASTM D7624 >20 5.4 8.8 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 17.1 19.4 19.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Soot %	%	*ASTM D7844	>3	0.1	0.2	0.2
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Nitration	Abs/cm	*ASTM D7624	>20	5.4	8.8	7.2
Oxidation Abs/.1mm *ASTM D7414 >25 13.5 16.8 16.2	Sulfation	Abs/.1mm	*ASTM D7415	>30		19.4	
	FLUID DEGRAI	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.5	16.8	16.2
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8		7.4	9.2

Fluid Condition

Contamination

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

There is no indication of any contamination in the

Resample at the next service interval to monitor.

All component wear rates are normal.

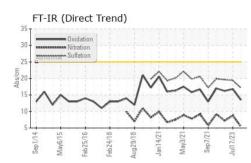
Report Id: GFL004 [WUSCAR] 06139503 (Generated: 04/06/2024 01:47:50) Rev: 1

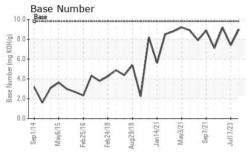
Submitted By: GFL004 and GLF112 - Marquis Williams

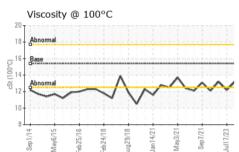
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OIL ANALYSIS REPORT







VISUAL		method				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	15.4	13.2	12.2	13.2
GRAPHS						

Ferrous Alloys

Non-ferrous Metals

19

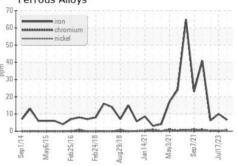
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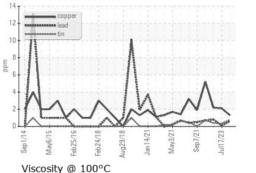
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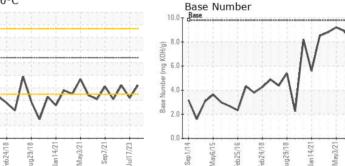
Sep 1/14

Am6/15

ab 25/1







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 GFL Environmental - 004 - Newport - Central Coast Sample No. 427 Roberts Road : GFL0111383 Received : 05 Apr 2024 Lab Number : 06139503 Tested : 05 Apr 2024 Newport, NC US 28570 Unique Number : 10964311 Diagnosed : 05 Apr 2024 - Wes Davis Test Package : FLEET Contact: Marguis Williams Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. marquis.williams@gflenv.com T: * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: (252)223-6010

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