

OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id

2449 MACK GRANITE

Diesel Engine

PETRO CANADA DURON SHP 15W40 (48 QTS)

DIAGNOSIS

Recommendation

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

All component wear rates are normal.

Contamination

There is an abnormal amount of solids and carbon present in the oil.

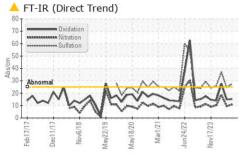
Fluid Condition

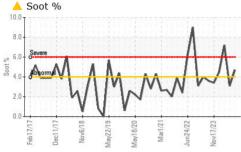
The BN level is low.

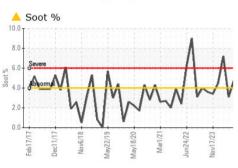
SAMPLE INFORMATION method limit/base current history1 GFL0094655 Sample Number Client Info 29 May 2024 03 May 2024 12 Mar 2024 4080 43868 43459 016 Age hrs Client Info 4080 43868 43459 016 Age hrs Client Info Changed Changed	[2017 Dw2017 New2018 Mey2019 Mey2020 Mw2022 New2022 New2023 Ne								
Sample Date Client Info 29 May 2024 0.3 May 2024 12 Mar 2024 Machine Age hrs Client Info 44080 43868 43459 Oil Age hrs Client Info 0 0 0 0 Oil Olanged Client Info Changed	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2		
Machine Age hrs Client Info 44080 43868 43459 Oil Age hrs Client Info 0 0 0 0 Oil Changed Client Info Changed Cha	Sample Number		Client Info		GFL0117508	GFL0117490	GFL0094655		
Oil Age hrs Client Info Changed Changed Changed Changed Changed Changed Changed Sample Status Client Info Changed ABNORMAL Changed Change	Sample Date		Client Info		29 May 2024	03 May 2024	12 Mar 2024		
Oil Changed Sample Status Client Info Changed ABNORMAL ABNORMAL ABNORMAL SEVERE Changed ABNORMAL ABNORMAL SEVERE Changed ABNORMAL ABNORMAL SEVERE Changed ABNORMAL SEVERE Current Several Se	Machine Age	hrs	Client Info		44080	43868	43459		
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Age	hrs	Client Info		0	0	0		
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Changed	Changed	Changed		
Fuel	Sample Status				ABNORMAL	ABNORMAL	SEVERE		
Water Glycol WC Method >0.2.2 NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >12.0 71 48 97 Chromium ppm ASTM D5185m >2.0 <1 1 2 Nickel ppm ASTM D5185m >5 0 0 <1 Silver ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >20 2 3 3 Aluminum ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >10 0 0 <1 Caddium ppm ASTM D5185m 0 0	CONTAMINAT	ION	method	limit/base	current	history1	history2		
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0		
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 71 48 97 Chromium ppm ASTM D5185m >20 <1	Water		WC Method	>0.2	NEG	NEG	NEG		
Iron	Glycol		WC Method		NEG	NEG	NEG		
Chromium ppm ASTM D5185m >20 <1 1 2 Nickel ppm ASTM D5185m >5 0 0 <1	WEAR METAL	S	method	limit/base	current	history1	history2		
Nickel ppm ASTM D5185m >5 0 0 <1 Titanium ppm ASTM D5185m >2 0 0 <1	Iron	ppm	ASTM D5185m	>120	71	48	97		
Titanium ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >20 2 3 3 Lead ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >330 48 43 113 Tin ppm ASTM D5185m >15 2 2 2 3 Vanadium ppm ASTM D5185m 0 0 0 <1 1 Cadmium ppm ASTM D5185m 0 0 0 <1 1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 1 Barium	Chromium	ppm	ASTM D5185m	>20	<1	1	2		
Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >20 2 3 3 Lead ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >330 48 43 113 Tin ppm ASTM D5185m >15 2 2 3 Vanadium ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 Barium ppm ASTM D5185m 0 0 1 <td>Nickel</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>5</td> <th>0</th> <td>0</td> <td><1</td>	Nickel	ppm	ASTM D5185m	>5	0	0	<1		
Aluminum ppm ASTM D5185m >20 2 3 3 Lead ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >330 48 43 113 Tin ppm ASTM D5185m >15 2 2 3 Vanadium ppm ASTM D5185m 0 0 0 <1	Titanium	ppm	ASTM D5185m	>2	0	0	<1		
Lead ppm ASTM D5185m >40 3 3 7 Copper ppm ASTM D5185m >330 48 43 113 Tin ppm ASTM D5185m >15 2 2 3 Vanadium ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 ADDITIVES method limit/base current history1 history2 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 0 0 0 0 Magnesium ppm ASTM D5185m 0 1 1 2 4 4 Calcium ppm ASTM D5185m 1070 1041 1159 1107 1107	Silver	ppm	ASTM D5185m	>2	0	0	<1		
Copper ppm ASTM D5185m >330 48 43 113 Tin ppm ASTM D5185m >15 2 2 3 Vanadium ppm ASTM D5185m 0 0 <1	Aluminum	ppm	ASTM D5185m	>20	2	3	3		
Tin ppm ASTM D5185m >15 2 2 3 Vanadium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 ADDITIVES method limit/base current limitory1 history2 Barium ppm ASTM D5185m 0 </td <td>Lead</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>40</td> <th>3</th> <td>3</td> <td>7</td>	Lead	ppm	ASTM D5185m	>40	3	3	7		
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base	Copper	ppm	ASTM D5185m	>330	48	43	113		
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 20<	Tin	ppm	ASTM D5185m	>15	2	2	3		
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m	Vanadium	ppm	ASTM D5185m		0	0	<1		
Boron ppm ASTM D5185m 0 2 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1	Cadmium	ppm	ASTM D5185m		0	0	<1		
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 20 <1 134 3 INFRA-RED method limit/base<	ADDITIVES		method	limit/base	current	history1	history2		
Molybdenum ppm ASTM D5185m 60 59 64 55 Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 20 <1	Boron	ppm	ASTM D5185m	0	2	3	2		
Manganese ppm ASTM D5185m 0 1 1 2 Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1	Barium	ppm	ASTM D5185m	0	0	0	0		
Magnesium ppm ASTM D5185m 1010 938 897 952 Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1	Molybdenum	ppm	ASTM D5185m	60	59	64			
Calcium ppm ASTM D5185m 1070 1041 1159 1107 Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1	Manganese	ppm	ASTM D5185m	0	1	1			
Phosphorus ppm ASTM D5185m 1150 1056 1032 953 Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 2 ▲ 82 4 Potassium ppm ASTM D5185m >20 <1	Magnesium	ppm							
Zinc ppm ASTM D5185m 1270 1240 1213 1224 Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1	Calcium	ppm	ASTM D5185m	1070		1159			
Sulfur ppm ASTM D5185m 2060 3236 3275 3052 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 2 ▲ 82 4 Potassium ppm ASTM D5185m >20 <1									
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m >20 <1 82 4 Potassium ppm ASTM D5185m >20 <1 134 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 4.7 3.1 ↑7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7		ppm							
Silicon ppm ASTM D5185m >25 5 6 4 Sodium ppm ASTM D5185m 2 82 4 Potassium ppm ASTM D5185m >20 <1 134 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 4.7 3.1 4 7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Sulfur	ppm	ASTM D5185m	2060	3236	3275	3052		
Sodium ppm ASTM D5185m 2 4 82 4 Potassium ppm ASTM D5185m >20 <1 134 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 4.7 3.1 4.7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	CONTAMINAN	ITS	method	limit/base	current	history1	history2		
Potassium ppm ASTM D5185m >20 <1 ▲ 134 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 4.7 3.1 ▲ 7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Silicon	ppm	ASTM D5185m	>25	5	6	4		
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 4.7 3.1 ▲ 7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Sodium	ppm	ASTM D5185m		2	<u>^</u> 82	4		
Soot % % *ASTM D7844 >4 ▲ 4.7 3.1 ▲ 7.2 Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Potassium	ppm	ASTM D5185m	>20	<1	▲ 134	3		
Nitration Abs/cm *ASTM D7624 >20 10.8 9.5 18.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	INFRA-RED		method	limit/base	current	history1	history2		
Sulfation Abs/.1mm *ASTM D7415 >30 27.4 24.6 36.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Soot %	%	*ASTM D7844	>4	4.7	3.1	1 7.2		
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Nitration	Abs/cm	*ASTM D7624	>20	10.8	9.5	18.6		
Oxidation Abs/.1mm *ASTM D7414 >25 15.3 14.9 27.7	Sulfation	Abs/.1mm	*ASTM D7415	>30	27.4	24.6	36.9		
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2		
	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.3	14.9	27.7		
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	<u> </u>	8.6	▲ 0.0		

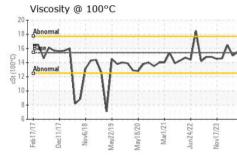


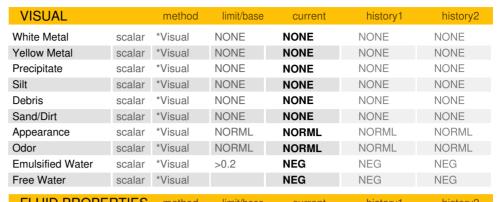
OIL ANALYSIS REPORT





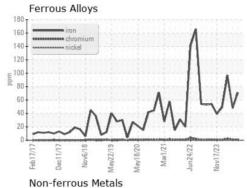


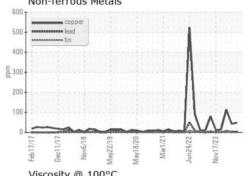


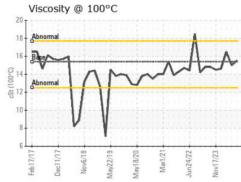


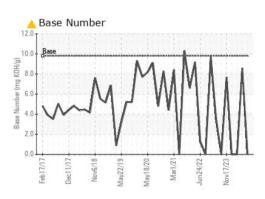
FLUID PROP	EKIIE2	method	ilmit/base	current	nistory i	nistoryz
Visc @ 100°C	cSt	ASTM D445	15.4	15.5	15.0	16.5

GRAPHS













Certificate 12367

Laboratory Sample No. Lab Number : 06196241

: GFL0117508 Unique Number : 11058364 Test Package : FLEET

To discuss this sample report, contact Customer Service at 1-800-237-1369.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 31 May 2024

Tested : 03 Jun 2024 Diagnosed : 03 Jun 2024 - Don Baldridge

GFL Environmental - 001 - Raleigh(CNG)

3741 Conquest Drive Garner, NC US 27529

Contact: Craig Johnson craig.johnson@gflenv.com T: (919)662-7100

 st - 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: (919)662-7130