

OIL ANALYSIS REPORT

Sample Rating Trend

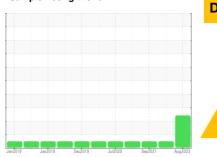
DEGRADATION



Machine Id 801053 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (19 LTR)





DIAGNOSIS

Recommendation

We advise that you check for faulty combustion and a possible overheat condition. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Iron ppm levels are abnormal. Cylinder, crank, or cam shaft wear is indicated.

Contamination

There is an abnormal level of sulfation indicated.

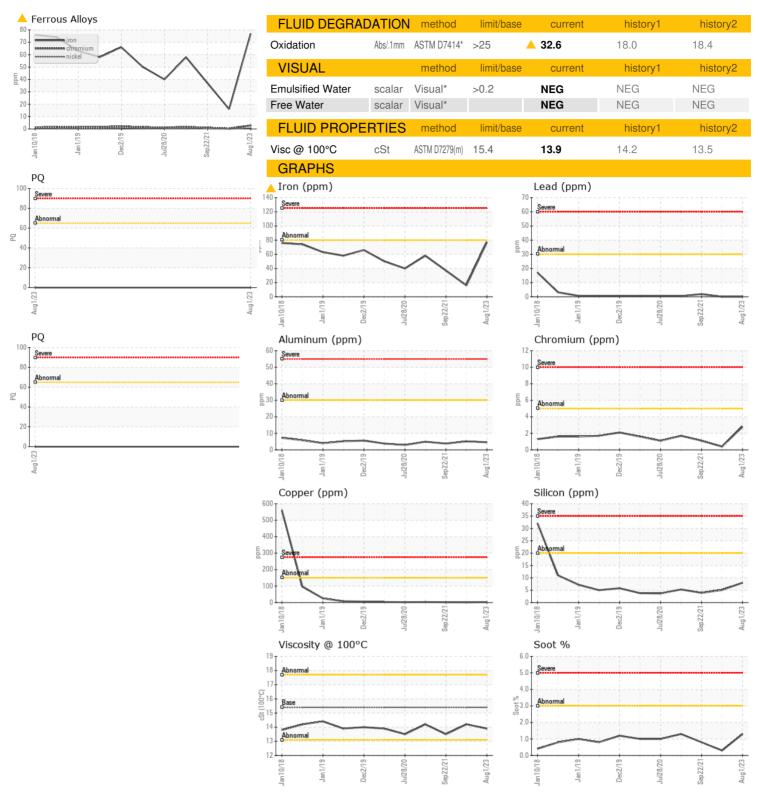
Fluid Condition

A small degree of oil oxidation was indicated. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

	1 3111 131140 (1	J L111)	Jan2018	Jan2019 Dec2019	Jul2020 Sep2021	Aug2023	
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 94157 94157 2519 Oil Age hrs Client Info 2519 0 0 Oil Changed Client Info Changed N/A Changed Sample Status Lead NCRMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0	Sample Number		Client Info		GFL0091029	GFL0059501	GFL0034429
Oil Age hrs Client Info 2519 0 0 Oil Changed Client Info Changed ABNORMAL N/A Changed Changed N/A Changed Changed N/A Changed Changed N/A Changed Changed N/A Changed N/A Changed N/A Changed N/A Changed N/A NORMAL NOR	Sample Date		Client Info		01 Aug 2023	15 Sep 2022	22 Sep 2021
Contained Client Info Changed N/A NORMAL NOR	Machine Age	hrs	Client Info		94157	94157	2519
ABNORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2	Oil Age	hrs	Client Info		2519	0	0
CONTAMINATION	Oil Changed		Client Info		Changed	N/A	Changed
Fuel	Sample Status				ABNORMAL	NORMAL	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 PQ ASTM D8184* >65 0 Iron ppm ASTM D5185(m) >80 777 16 37 Chromium ppm ASTM D5185(m) >5 3 <1	Fuel		WC Method	>5	<1.0	<1.0	<1.0
PQ ASTM D8184* >65 0 Iron ppm ASTM D5185(m) >80 ↑ 77 16 37 Chromium ppm ASTM D5185(m) >5 3 <1 1 Nickel ppm ASTM D5185(m) >2 <1 <1 0 Silver ppm ASTM D5185(m) >3 0 0 <1 Aluminum ppm ASTM D5185(m) >3 0 0 <1 Aluminum ppm ASTM D5185(m) >30 0 0 <1 Aluminum ppm ASTM D5185(m) >30 0 0 2 Lead ppm ASTM D5185(m) >30 0 0 2 Copper ppm ASTM D5185(m) >5 0 0 <1 0 Vandium ppm ASTM D5185(m) 0 0 0 0 0 Beryllium ppm ASTM D5185(m) 0	Glycol		WC Method		NEG	NEG	NEG
STATU D5185(m)	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium	PQ		ASTM D8184*	>65	0		
Nickel	Iron	ppm	ASTM D5185(m)	>80	<u> 77</u>	16	37
Titanium	Chromium	ppm	ASTM D5185(m)	>5	3	<1	1
Silver	Nickel	ppm	ASTM D5185(m)	>2	<1	0	<1
Aluminum	Titanium	ppm	ASTM D5185(m)		<1	<1	0
Lead	Silver	ppm	ASTM D5185(m)	>3	0	0	<1
Copper	Aluminum	ppm	ASTM D5185(m)	>30	5	5	4
Tin	Lead	ppm	ASTM D5185(m)	>30	0	0	2
Antimony	Copper	ppm	ASTM D5185(m)	>150	2	1	2
Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 6 18 11 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 56 69 68 Manganese ppm ASTM D5185(m) 0 <1	Tin	ppm	ASTM D5185(m)	>5	0	0	<1
Beryllium	Antimony	ppm	ASTM D5185(m)		0	<1	0
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 6 18 11 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 56 69 68 Manganese ppm ASTM D5185(m) 0 <1	Vanadium	ppm	ASTM D5185(m)		0	0	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 6 18 11 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 56 69 68 Manganese ppm ASTM D5185(m) 0 <1	Beryllium	ppm	ASTM D5185(m)		0	0	0
Boron	Cadmium	ppm	ASTM D5185(m)		0	0	0
Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 56 69 68 Manganese ppm ASTM D5185(m) 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185(m) 60 56 69 68 Manganese ppm ASTM D5185(m) 0 <1 <1 <1 Magnesium ppm ASTM D5185(m) 1010 878 915 937 Calcium ppm ASTM D5185(m) 1070 959 1147 1139 Phosphorus ppm ASTM D5185(m) 1150 947 989 1009 Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) 2060 2089 2430 2391 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method	Boron	ppm	ASTM D5185(m)	0	6	18	11
Manganese ppm ASTM D5185(m) 0 <1 <1 <1 Magnesium ppm ASTM D5185(m) 1010 878 915 937 Calcium ppm ASTM D5185(m) 1070 959 1147 1139 Phosphorus ppm ASTM D5185(m) 1150 947 989 1009 Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) 20 8 5 4 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method <td>Barium</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>0</td> <th>0</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185(m)	0	0	0	0
Magnesium ppm ASTM D5185(m) 1010 878 915 937 Calcium ppm ASTM D5185(m) 1070 959 1147 1139 Phosphorus ppm ASTM D5185(m) 1150 947 989 1009 Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) < 1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D	Molybdenum	ppm	ASTM D5185(m)	60	56	69	68
Calcium ppm ASTM D5185(m) 1070 959 1147 1139 Phosphorus ppm ASTM D5185(m) 1150 947 989 1009 Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) <1	Manganese	ppm	ASTM D5185(m)	0	<1	<1	<1
Phosphorus ppm ASTM D5185(m) 1150 947 989 1009 Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) >20 8 5 4 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Magnesium	ppm	ASTM D5185(m)	1010	878	915	937
Zinc ppm ASTM D5185(m) 1270 1091 1110 1154 Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) >20 4 6 3 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Calcium	ppm	ASTM D5185(m)	1070	959	1147	1139
Sulfur ppm ASTM D5185(m) 2060 2089 2430 2391 Lithium ppm ASTM D5185(m) 2060 2089 2430 2391 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) 10 8 12 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Phosphorus	ppm	ASTM D5185(m)	1150	947	989	1009
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) 10 8 12 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Zinc	ppm	ASTM D5185(m)	1270	1091	1110	1154
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) 10 8 12 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Sulfur	ppm	ASTM D5185(m)	2060	2089	2430	2391
Silicon ppm ASTM D5185(m) >20 8 5 4 Sodium ppm ASTM D5185(m) 10 8 12 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Lithium	ppm	ASTM D5185(m)		<1	<1	<1
Sodium ppm ASTM D5185(m) 10 8 12 Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185(m) >20 4 6 3 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Silicon	ppm	ASTM D5185(m)	>20	8	5	4
INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Sodium	ppm	ASTM D5185(m)		10	8	
Soot % % ASTM D7844* >3 1.3 0.3 0.8 Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	Potassium	ppm	ASTM D5185(m)	>20	4	6	3
Nitration Abs/cm ASTM D7624* >20 17.4 9.6 10.5	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	ASTM D7844*	>3	1.3	0.3	8.0
Sulfation Abs/.1mm ASTM D7415* >30 ▲ 32.0 21.7 22.8	Nitration	Abs/cm	ASTM D7624*	>20	17.4	9.6	10.5
	Sulfation	Abs/.1mm	ASTM D7415*	>30	△ 32.0	21.7	22.8



OIL ANALYSIS REPORT





CALA ISO 17025:2017 Accredited

Laboratory Sample No. Lab Number Unique Number

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : GFL0091029

Received : 02576144 Diagnosed : 5629204

Diagnostician : Kevin Marson Test Package : MOB 1 (Additional Tests: PQ)

: 16 Aug 2023 : 17 Aug 2023

GFL Environmental - 217 - Aurora 14131 BAYVIEW AVE, AURORA YARD AURORA, ON CA L4G 0K6

Contact: Mike Havens MHavens@gflenv.com T:

F: (905)713-2445

To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.