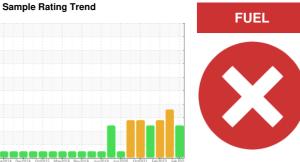


OIL ANALYSIS REPORT





Machine Id **8982** Component **Diesel Engine**

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

DIAGNOSIS

Recommendation

We advise that you check the fuel injection system. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

▲ Contamination

There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

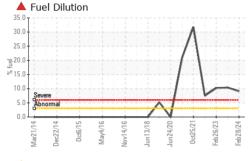
Fluid Condition

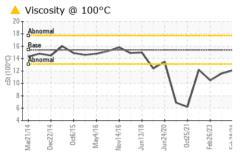
Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

Machine Age hrs Client Info 183252 7985 164746 Oil Age hrs Client Info 0 152862 0 Oil Changed Client Info Changed N/A N/A Sample Status SEVERE SEVERE SEVERE CONTAMINATION method limit/base current history1 history2 Water WC Method NEG NEG NEG NEG NEG Glycol WC Method NEG NEG N.EG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >20 2 3 2 Iron ppm ASTM D5185(m) >20 2 3 2 Nickel ppm ASTM D5185(m) >2 0 0 0 Aluminum ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm			1872014 DBC201	· ·	016 Jun2018 Jun2020 Oct2021 Fe		
Sample Date Client Info 28 Feb 2024 21 Jun 2023 26 Feb 2028 Machine Age hrs Client Info 0 183252 7985 164746 Old Age hrs Client Info 0 152862 0 Old Changed N/A N/A Sample Status SEVERE SEVERE	SAMPLE INFORM	NOITAN	method	limit/base	current	history1	history2
Machine Age hrs	Sample Number		Client Info		GFL0113173	GFL0085246	GFL0060032
Oil Age hrs Client Info 0 152862 0 Oil Changed Sample Status Client Info Changed SEVERE N/A N/A Sample Status SEVERE SEVERE SEVERE SEVERE CONTAMINATION method limit/base current history1 history2 Water Gilycol WC Method WC Method (limit/base NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5186/ml >90 36 25 36 Chromium ppm ASTM D5186/ml >20 2 3 2 Nickel ppm ASTM D5186/ml >20 0 0 0 Silver ppm ASTM D5186/ml >20 3 4 1 Lead ppm ASTM D5186/ml >20 3 4 1 Copper ppm ASTM D5186/ml >30 <1	Sample Date		Client Info		28 Feb 2024	21 Jun 2023	26 Feb 2023
Client Info	Machine Age	hrs	Client Info		183252	7985	164746
Sample Status	Oil Age	hrs	Client Info		0	152862	0
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >90 36 25 36 Chromium ppm ASTM D5185(m) >20 2 3 2 Nickel ppm ASTM D5185(m) >2 0 0 0 Silver ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >30 <1 <1 <1 Tin ppm ASTM D5185(m) >30 <1 <1 <1 Ead ppm ASTM D5185(m) >10 0 <1 Vanadium <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>Changed</th> <th>N/A</th> <th>N/A</th>	Oil Changed		Client Info		Changed	N/A	N/A
Water Glycol WC Method WC Method >0.2 NEG NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current bistory1 history2 Iron ppm ASTM 05185(m) ppm ASTM 05185(m) >20 2 3 2 Nickel ppm ASTM 05185(m) >20 2 3 2 Nickel ppm ASTM 05185(m) >2 0 0 0 Silver ppm ASTM 05185(m) >2 0 0 0 Silver ppm ASTM 05185(m) >2 0 1 0 Aluminum ppm ASTM 05185(m) >2 0 1 0 Aluminum ppm ASTM 05185(m) >2 0 1 0 Copper ppm ASTM 05185(m) >33.0 <1 <1 <1 <1 Tin ppm ASTM 05185(m) >33.0 <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				SEVERE	SEVERE	SEVERE
WEAR METALS	CONTAMINATI	ON	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >90 36 25 36 Chromium ppm ASTM D5185(m) >20 2 3 2 Nickel ppm ASTM D5185(m) >2 -1 <1 <1 Titanium ppm ASTM D5185(m) >2 0 0 0 Aluminum ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) 0 0 <1 1 Vanadium ppm ASTM D5185(m) 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	0.0	NEG
Chromium ppm ASTM D5185(m) >20 2 3 2 Nickel ppm ASTM D5185(m) >2 <1 <1 <1 Titanium ppm ASTM D5185(m) >2 0 0 0 Silver ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >40 0 <1 0 Copper ppm ASTM D5185(m) >330 <1 <1 <1 Tin ppm ASTM D5185(m) >15 0 0 <1 Antimony ppm ASTM D5185(m) 0 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1	WEAR METALS	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185(m)	>90	36	25	36
Titanium ppm ASTM D5185(m) >2 0 0 0 Silver ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >40 0 <1 0 Copper ppm ASTM D5185(m) >330 <1 <1 <1 Tin ppm ASTM D5185(m) >15 0 0 <1 Antimony ppm ASTM D5185(m) 0 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 4 <td< th=""><th>Chromium</th><th>ppm</th><th>ASTM D5185(m)</th><th>>20</th><th>2</th><th>3</th><th>2</th></td<>	Chromium	ppm	ASTM D5185(m)	>20	2	3	2
Silver ppm ASTM D5185(m) >2 0 1 0 Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >40 0 <1	Nickel	ppm	. ,		<1	<1	<1
Aluminum ppm ASTM D5185(m) >20 3 4 1 Lead ppm ASTM D5185(m) >40 0 <1 0 Copper ppm ASTM D5185(m) >330 <1 <1 <1 Tin ppm ASTM D5185(m) >15 0 0 <1 Antimony ppm ASTM D5185(m) 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Boron ppm ASTM D5185(m) 0 4 3 4 4 Barium ppm ASTM D5185(m) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Titanium	ppm	ASTM D5185(m)	>2	0	0	0
Lead ppm ASTM D5185(m) >40 0 <1	Silver	ppm	ASTM D5185(m)	>2	0	1	
Copper ppm ASTM D5185(m) >330 <1	Aluminum	ppm	ASTM D5185(m)	>20		4	1
Tin ppm ASTM D5185(m) >15 0 0 <1		ppm	. ,		0		0
Antimony ppm ASTM D5185(m) 0 0 <1	Copper	ppm	ASTM D5185(m)	>330	<1	<1	<1
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 4 3 4 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 Manganese ppm ASTM D5185(m) 0 0 <1	Tin	ppm	ASTM D5185(m)	>15	0	0	<1
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 4 3 4 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 Manganese ppm ASTM D5185(m) 0 0 <1	Antimony	ppm	ASTM D5185(m)		0	0	<1
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 4 3 4 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 53 52 49 Manganese ppm ASTM D5185(m) 0 0 <1 <1 Magnesium ppm ASTM D5185(m) 1010 814 858 782 Calcium ppm ASTM D5185(m) 1070 921 928 893 Phosphorus ppm ASTM D5185(m) 1150 891 973 884 Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) >25	Vanadium	ppm	ASTM D5185(m)		0	0	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 4 3 4 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 53 52 49 Manganese ppm ASTM D5185(m) 0 0 <1 <1 Magnesium ppm ASTM D5185(m) 1010 814 858 782 Calcium ppm ASTM D5185(m) 1070 921 928 893 Phosphorus ppm ASTM D5185(m) 1150 891 973 884 Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m)	Beryllium	ppm	ASTM D5185(m)		0	0	0
Boron ppm ASTM D5185(m) 0 4 3 4 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 53 52 49 Manganese ppm ASTM D5185(m) 0 0 <1	Cadmium	ppm	ASTM D5185(m)		0	0	0
Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 60 53 52 49 Manganese ppm ASTM D5185(m) 0 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185(m) 60 53 52 49 Manganese ppm ASTM D5185(m) 0 0 <1	Boron	ppm	ASTM D5185(m)	0	4	3	4
Manganese ppm ASTM D5185(m) 0 <1	Barium	ppm	ASTM D5185(m)	0	0	0	0
Magnesium ppm ASTM D5185(m) 1010 814 858 782 Calcium ppm ASTM D5185(m) 1070 921 928 893 Phosphorus ppm ASTM D5185(m) 1150 891 973 884 Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) 2060 2387 2344 2115 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D76	Molybdenum	ppm	ASTM D5185(m)	60	53	52	49
Calcium ppm ASTM D5185(m) 1070 921 928 893 Phosphorus ppm ASTM D5185(m) 1150 891 973 884 Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) 2060 2387 2344 2115 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m) >26 166 3 Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D76	Manganese	ppm	ASTM D5185(m)	0	0	<1	<1
Phosphorus ppm ASTM D5185(m) 1150 891 973 884 Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) 2060 2387 2344 2115 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m) >26 166 3 Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624*	Magnesium	ppm	ASTM D5185(m)	1010	814	858	782
Zinc ppm ASTM D5185(m) 1270 1035 1050 955 Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) <1	Calcium	ppm	ASTM D5185(m)	1070	921	928	893
Sulfur ppm ASTM D5185(m) 2060 2387 2344 2115 Lithium ppm ASTM D5185(m) < 1	Phosphorus	ppm	ASTM D5185(m)	1150	891	973	884
Lithium ppm ASTM D5185(m) <1	Zinc	ppm	ASTM D5185(m)	1270	1035	1050	955
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m) 26 166 3 Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Sulfur	ppm	ASTM D5185(m)	2060	2387	2344	2115
Silicon ppm ASTM D5185(m) >25 4 4 6 Sodium ppm ASTM D5185(m) 26 166 3 Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 4 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Lithium	ppm	ASTM D5185(m)		<1	<1	<1
Sodium ppm ASTM D5185(m) 26 166 3 Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 ▲ 9.1 ▲ 10.4 ▲ 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185(m) >20 1 2 0 Fuel % ASTM D7593* >3.0 4 9.1 10.4 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Silicon	ppm	ASTM D5185(m)	>25	4	4	6
Fuel % ASTM D7593* >3.0 ♣ 9.1 ▲ 10.4 ▲ 10.2 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Sodium	ppm	ASTM D5185(m)		26	166	3
INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Potassium	ppm	ASTM D5185(m)	>20	1	2	0
Soot % % ASTM D7844* >6 1 0.4 0.5 Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	Fuel	%	ASTM D7593*	>3.0	▲ 9.1	▲ 10.4	▲ 10.2
Nitration Abs/cm ASTM D7624* >20 9.2 7.1 9.7	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	ASTM D7844*	>6	1	0.4	0.5
	Nitration	Abs/cm	ASTM D7624*	>20	9.2	7.1	9.7
	Sulfation	Abs/.1mm			20.7	18.6	22.2



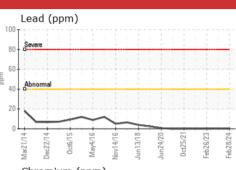
OIL ANALYSIS REPORT

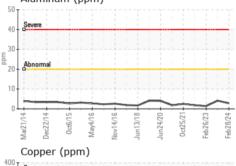


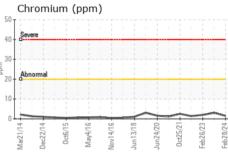


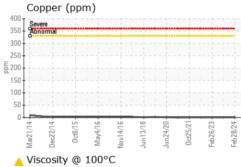
FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	16.4	14.0	18.0
VISUAL		method	limit/base	current	history1	history2
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D7279(m)	15.4	<u> </u>	▲ 11.6	▲ 10.5
GRAPHS						

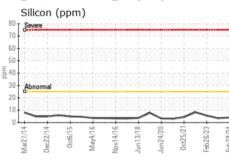
Iron (opm)							
200 Severe			1				1	
200								
150						Hi		
100 - Abnorma								
				- /	1			
50-			_		1	~		
0	_							
1/14	Oct6/15	May4/16	4/16	3/18	4/20	Oct25/21	6/23	Feb28/24
Mar21/14 Dec22/14	Oct	Мау	Nov14/16	Jun13/18	Jun24/20	Oct2	Feb 26/23	Feb 2
Alumi	num (nnm'						
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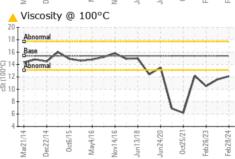


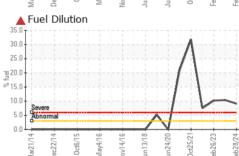














CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No.

: GFL0113173 Lab Number : 02619839 Unique Number : 5736949

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Received **Tested**

Diagnosed Test Package: MOB 1 (Additional Tests: PercentFuel)

: 05 Mar 2024 : 06 Mar 2024

: 06 Mar 2024 - Wes Davis

20 Brydon Drive Etobicoke, ON CA M9W 5R6 Contact: Kim McCall kmccall@gflenv.com T:

GFL Environmental - 225 - COT(D2)

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.

F: