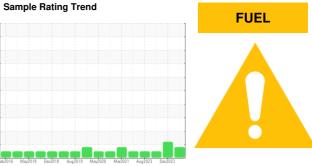


OIL ANALYSIS REPORT





Machine Id **7980** Component **Diesel Engine**

PETRO CANADA DURON SHP 15W40 (19 LTR)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

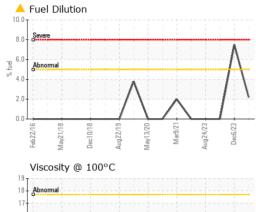
Fluid Condition

The condition of the oil is acceptable for the time in service.

Sample Date	-662016 May2018 Dec2019 Aug2019 May2020 Mar2021 Aug2023 Dec2023							
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2	
Machine Age kms Client Info 194946 0 0 0 Oil Age kms Client Info 194946 0 0 0 Oil Changed Client Info N/A Changed Changed Changed Sample Status Image: Client Info N/A Changed Changed NC Part (ABNORMAL) NCRMAL CONTAMINATION method Ilmit/base current history1 history2 Water WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM05185m) >80 6 21 24 Chromium ppm ASTM05185m) >5 0 <1 <1 1 Iron ppm ASTM05185m) >3 <1 <1 <1 <1 Chromium ppm ASTM05185m) >3 <1 <1 <1 <1 <1 <1 <t< th=""><th>Sample Number</th><th></th><th>Client Info</th><th></th><th>WC0875109</th><th>WC0875105</th><th>GFL0094210</th></t<>	Sample Number		Client Info		WC0875109	WC0875105	GFL0094210	
Oil Age kms Client Info 194946 0 0 0 Oil Changed Client Info N/A Changed Changed Changed Sample Status MARGINAL MARGINAL ABNORMAL NORMAL Wother WC Method NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185(m) >80 6 21 24 Chromium ppm ASTM 05185(m) >5 0 <1	Sample Date		Client Info		13 Dec 2023	06 Dec 2023	03 Oct 2023	
Oil Changed Sample Status	Machine Age	kms	Client Info		194946	194946	143821	
Sample Status	Oil Age	kms	Client Info		194946	0	0	
CONTAMINATION method limit/base current history1 history2	Oil Changed		Client Info		N/A	Changed	Changed	
Water WC Method >0.2 NEG <	Sample Status				MARGINAL	ABNORMAL	NORMAL	
Select	CONTAMINATION	١	method	limit/base	current	history1	history2	
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >80 6 21 24 Chromium ppm ASTM D5185(m) >5 0 <1 <1 Nickel ppm ASTM D5185(m) >2 0 <1 0 Titanium ppm ASTM D5185(m) >3 <1 <1 <1 Aluminum ppm ASTM D5185(m) >30 0 <1 <1 Lead ppm ASTM D5185(m) >30 0 <1 <1 Copper ppm ASTM D5185(m) >30 0 <1 <1 Vanadium ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 <th>Water</th> <th></th> <th>WC Method</th> <th>>0.2</th> <th>NEG</th> <th>NEG</th> <th>NEG</th>	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium ppm ASTM D5185(m) >5 0 <1	WEAR METALS		method	limit/base	current	history1	history2	
Nickel ppm ASTM D5185(m) >2 0 <1	Iron	ppm	ASTM D5185(m)	>80	6	21	24	
Titanium ppm ASTM D5185(m) 0 0 0 Silver ppm ASTM D5185(m) >3 <1 <1 <1 Aluminum ppm ASTM D5185(m) >30 1 2 3 Lead ppm ASTM D5185(m) >30 0 <1 <1 2 Copper ppm ASTM D5185(m) >50 0 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 <th>Chromium</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>>5</th> <th>0</th> <th><1</th> <th><1</th>	Chromium	ppm	ASTM D5185(m)	>5	0	<1	<1	
Silver ppm ASTM D5185(m) >3 <1	Nickel	ppm	ASTM D5185(m)	>2		<1		
Aluminum ppm ASTM D5185(m) >30 1 2 3 Lead ppm ASTM D5185(m) >30 0 <1 <1 Copper ppm ASTM D5185(m) >150 <1 <1 2 Tin ppm ASTM D5185(m) >5 0 0 0 Antimony 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 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 24 39 3 Barium ppm ASTM D5185(m) 60 60 59 57 Molybdenum ppm ASTM D5185(m) 0 0 <	Titanium	ppm	ASTM D5185(m)		0	0	0	
Lead ppm ASTM D5185(m) >30 0 <1	Silver	ppm	()					
Copper ppm ASTM D518S(m) >150 <1		ppm	ASTM D5185(m)					
Tin ppm ASTM D5185(m) >5 0 0 0 Antimony 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 Cadmium ppm ASTM D5185(m) 0 24 39 3 Boron ppm ASTM D5185(m) 0 <1	Lead	ppm	. ,					
Antimony 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 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 24 39 3 Barium ppm ASTM D5185(m) 0 <1	Copper	ppm	()	>150			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 24 39 3 Barium ppm ASTM D5185(m) 0 <1				>5				
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 24 39 3 Barium ppm ASTM D5185(m) 0 <1	•	ppm	()					
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 24 39 3 Barium ppm ASTM D5185(m) 0 <1 <1 <1 Molybdenum ppm ASTM D5185(m) 60 60 59 57 Manganese ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 1010 910 793 908 Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20			(/					
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 24 39 3 Barium ppm ASTM D5185(m) 0 <1 <1 <1 Molybdenum ppm ASTM D5185(m) 60 60 59 57 Manganese ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 1010 910 793 908 Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m)<	•		\ /					
Boron ppm ASTM D5185(m) 0 24 39 3 Barium ppm ASTM D5185(m) 0 <1	Cadmium	ppm	ASTM D5185(m)		0	0	0	
Barium ppm ASTM D5185(m) 0 <1	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185(m) 60 60 59 57 Manganese ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 1010 910 793 908 Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 4 5 4 Fuel % ASTM D518	Boron	ppm	ASTM D5185(m)	0	24	39	3	
Manganese ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 1010 910 793 908 Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 20 4 5 4 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 0 <1 <1 Fuel %	Barium	ppm	ASTM D5185(m)	0	<1	<1	<1	
Magnesium ppm ASTM D5185(m) 1010 910 793 908 Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 2060 2582 2312 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 0 <1	Molybdenum	ppm	ASTM D5185(m)	60	60	59	57	
Calcium ppm ASTM D5185(m) 1070 1010 1005 1016 Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 20 4 1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 4 5 4 Potassium ppm ASTM D5185(m) >20 0 <1 <1 Fuel % ASTM D7593* >5 ▲ 2.2 ▲ 7.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % <th>Manganese</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th>	Manganese	ppm	ASTM D5185(m)	0	0	0	0	
Phosphorus ppm ASTM D5185(m) 1150 972 899 973 Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 2060 2582 2312 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 4 5 6 Potassium ppm ASTM D5185(m) >20 0 <1	Magnesium	ppm	ASTM D5185(m)	1010	910	793		
Zinc ppm ASTM D5185(m) 1270 1166 1094 1155 Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) 2060 2582 2312 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) >20 0 <1 <1 Potassium ppm ASTM D5185(m) >20 0 <1 <1 Fuel % ASTM D7593* >5 2.2 7.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >3 0 0.3 0.3 Nitration Abs/cm ASTM D7624* >20 5.4 9.3 9.0	Calcium	ppm	ASTM D5185(m)	1070	1010	1005	1016	
Sulfur ppm ASTM D5185(m) 2060 2582 2312 2418 Lithium ppm ASTM D5185(m) <1	Phosphorus	ppm			972			
Lithium ppm ASTM D5185(m) <1	Zinc	ppm	ASTM D5185(m)	1270	1166	1094	1155	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) 3 5 6 Potassium ppm ASTM D5185(m) >20 0 <1 <1 Fuel % ASTM D7593* >5 ▲ 2.2 ▲ 7.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7644* >3 0 0.3 0.3 Nitration Abs/cm ASTM D7624* >20 5.4 9.3 9.0		ppm	(/	2060	2582		2418	
Silicon ppm ASTM D5185(m) >20 4 5 4 Sodium ppm ASTM D5185(m) 3 5 6 Potassium ppm ASTM D5185(m) >20 0 <1	Lithium	ppm	ASTM D5185(m)		<1	<1	<1	
Sodium ppm ASTM D5185(m) 3 5 6 Potassium ppm ASTM D5185(m) >20 0 <1	CONTAMINANTS		method	limit/base	current	history1	history2	
Potassium ppm ASTM D5185(m) >20 0 <1	Silicon	ppm	ASTM D5185(m)	>20	4	5	4	
Fuel % ASTM D7593* >5 ▲ 2.2 ▲ 7.5 <1.0	Sodium	ppm	ASTM D5185(m)		3	5	6	
INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0 0.3 0.3 Nitration Abs/cm ASTM D7624* >20 5.4 9.3 9.0	Potassium	ppm	ASTM D5185(m)	>20	0	<1	<1	
Soot % % ASTM D7844* >3 0 0.3 0.3 Nitration Abs/cm ASTM D7624* >20 5.4 9.3 9.0	Fuel	%	ASTM D7593*	>5	<u>^</u> 2.2	<u>^</u> 7.5	<1.0	
Nitration Abs/cm ASTM D7624* >20 5.4 9.3 9.0	INFRA-RED		method	limit/base	current	history1	history2	
	Soot %	%	ASTM D7844*	>3	0	0.3	0.3	
Sulfation Abs/.1mm ASTM D7415* >30 18.2 20.2 19.5	Nitration	Abs/cm	ASTM D7624*	>20	5.4	9.3		
	Sulfation	Abs/.1mm	ASTM D7415*	>30	18.2	20.2	19.5	



OIL ANALYSIS REPORT



FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	13.7	17.4	16.3
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE		
Yellow Metal	scalar	Visual*	NONE	NONE		
Precipitate	scalar	Visual*	NONE	NONE		
Silt	scalar	Visual*	NONE	NONE		
Debris	scalar	Visual*	NONE	NONE		
Sand/Dirt	scalar	Visual*	NONE	NONE		
Appearance	scalar	Visual*	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 PROPERT	TES	method	limit/base	current	history1	history2

18 - Abno	ormal							-
(516 Base 00115								
73 14 Abno	ormal		\rightarrow					/
12							\	
Feb22/16	May21/18	Dec10/18	Aug22/19	May13/20	Mar9/21	Aug24/23	Dec6/23	

14.0 **12.0** 12.7 Visc @ 100°C cSt ASTM D7279(m) 15.4 **GRAPHS** Iron (ppm) Lead (ppm) 100 E 40 20 Aluminum (ppm) Chromium (ppm) Copper (ppm) Silicon (ppm) 400 300 를 200 E 20 100 Viscosity @ 100°C Fuel Dilution 8.0 % fuel 2.0 0.0



CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No. Lab Number Unique Number

: 5696137

: WC0875109 : 02603052

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

Recieved : 14 Dec 2023 Diagnosed : 15 Dec 2023

Diagnostician : Wes Davis

Test Package : MOB 1 (Additional Tests: PercentFuel, Visual)

14131 BAYVIEW AVE, AURORA YARD AURORA, ON CA L4G 0K6

GFL Environmental - 217 - Aurora

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.