

OIL ANALYSIS REPORT

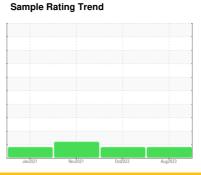
FUEL

HALIFAX WATER COMPANY [217431] **INTERNATIONAL WH1306N1113629**

Component

Diesel Engine

PETRO CANADA 15W40 (--- GAL)





DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Metal levels are typical for a new component breaking in.

Contamination

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

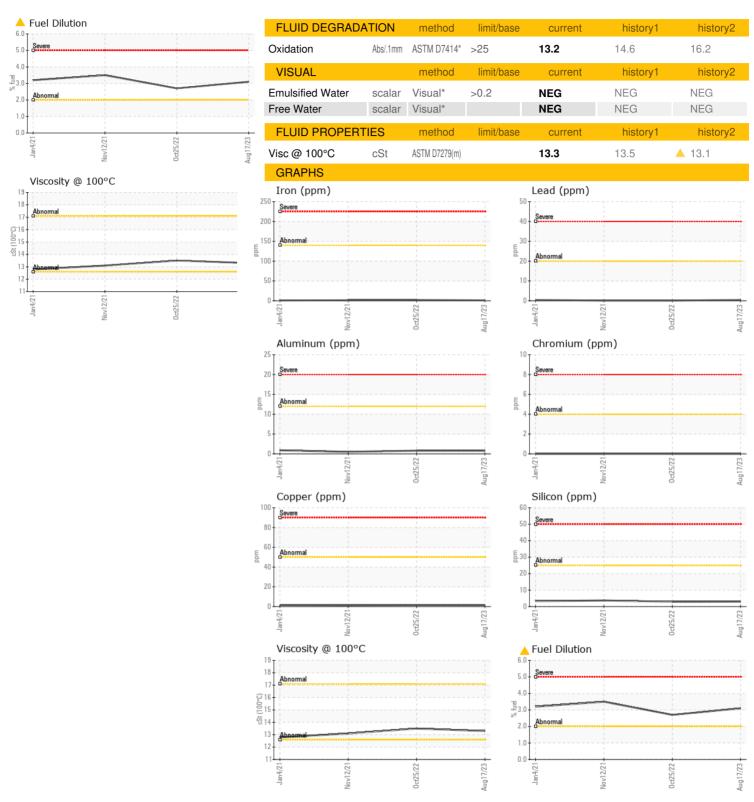
Fluid Condition

The oil is no longer serviceable due to the presence of contaminants.

Sample Number Client Info WA0020718 WA0018298 WA001725 Sample Date Client Info 17 Aug 2023 25 Oct 2022 12 Nov 203 Machine Age hrs Client Info 553 531 430 Oil Age hrs Client Info 25 100 17 Oil Changed Client Info Changed Changed Changed Changed Changed Changed Changed Changed Changed ABNORMAL ABNORMAL<			Jan202	1 Nov2021	Oct2022 A	ug2023	
Sample Date Client Info 17 Aug 2023 25 Oct 2022 12 Nov 202	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 553 531 430 Oil Age hrs Client Info 25 100 17 Oil Changed Client Info Changed Changed Changed ABNORMAL	Sample Number		Client Info		WA0020718	WA0018298	WA0017292
Oil Age hrs Client Info 25 100 17 Oil Changed Client Info Changed Changed </td <td>Sample Date</td> <td></td> <td>Client Info</td> <td></td> <td>17 Aug 2023</td> <td>25 Oct 2022</td> <td>12 Nov 2021</td>	Sample Date		Client Info		17 Aug 2023	25 Oct 2022	12 Nov 2021
Oil Changed Sample Status Client Info Sample Status Changed ABNORMAL AB	Machine Age	hrs	Client Info		553	531	430
Sample Status Method (mitiral) Contamination Abnormal (mitiral)	Oil Age	hrs	Client Info		25	100	17
CONTAMINATION method limit/base current history1 history Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM DS185(m) >4 0 0 0 Nickel ppm ASTM DS185(m) >4 0 0 0 Silver ppm ASTM DS185(m) >3 <1	Oil Changed		Client Info		Changed	Changed	Changed
Water Glycol WC Method >0.2 NEG NEG NEG 0.0 WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185(m) >140 1 2 1 Chromium ppm ASTM D5185(m) >4 0 0 0 Nickel ppm ASTM D5185(m) >4 0 0 0 Silver ppm ASTM D5185(m) >3 <1 0 <1 Aluminum ppm ASTM D5185(m) >3 <1 0 <1 Lead ppm ASTM D5185(m) >20 <1 <1 <1 <1 Copper ppm ASTM D5185(m) >20 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Sample Status				_		ABNORMAL
Glycol WC Method NEG NEG 0.0 WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185(m) >140 1 2 1 Chromium ppm ASTM D5185(m) >4 0 0 0 Nickel ppm ASTM D5185(m) >4 0 0 0 Silver ppm ASTM D5185(m) >3 <1 0 <1 Lead ppm ASTM D5185(m) >20 <1 <1 <1 <1 Lead ppm ASTM D5185(m) >20 <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	CONTAMINATION	١	method	limit/base	current	history1	history2
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	0.0
Chromium ppm ASTM D5185(m) >4 0 0 0 Nickel ppm ASTM D5185(m) >4 0 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185(m) >4 0 0 <1 Titanium ppm ASTM D5185(m) 3 <1	Iron	ppm	ASTM D5185(m)	>140	1	2	1
Titanium ppm ASTM D5185(m) 0 0 0 Silver ppm ASTM D5185(m) >3 <1	Chromium	ppm	ASTM D5185(m)	>4	0	0	0
Silver	Nickel	ppm	ASTM D5185(m)	>4	0	0	<1
Silver ppm ASTM D5185(m) >3 <1 0 <1 Aluminum ppm ASTM D5185(m) >12 <1 <1 <1 Lead ppm ASTM D5185(m) >20 <1 <1 <1 Copper ppm ASTM D5185(m) >50 2 2 2 1 Tin ppm ASTM D5185(m) >50 2 2 2 1 Antimony ppm ASTM D5185(m) 0 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 <1 Vanadium ppm ASTM D5185(m) 0 0 0 <1 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m)	Titanium		ASTM D5185(m)		0	0	0
Aluminum ppm ASTM D5185(m) >12 <1 <1 <1 Lead ppm ASTM D5185(m) >20 <1	Silver		. ,	>3	<1		<1
Lead ppm ASTM D5185(m) >20 <1 <1 <1 Copper ppm ASTM D5185(m) >50 2 2 1 Tin ppm ASTM D5185(m) >4 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 <1 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 history1 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1 0 0 Barium ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 942 848 96 Calcium	Aluminum		. ,		<1		
Copper ppm ASTM D5185(m) >50 2 2 1 Tin ppm ASTM D5185(m) >4 0 0 0 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 history1 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1	Lead			>20	<1	<1	<1
Tin ppm ASTM D5185(m) >4 0 0 0 Antimony ppm ASTM D5185(m) 0 0 <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 history1 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 <th< td=""><td>Copper</td><td></td><td>. ,</td><td>>50</td><td>2</td><td>2</td><td>1</td></th<>	Copper		. ,	>50	2	2	1
Antimony ppm ASTM D5185(m) 0 0 <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 history3 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1			. ,		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 history3 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current <th< td=""><td></td><td></td><td>. ,</td><td></td><td></td><td></td><td></td></th<>			. ,				
Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history3 Silicon ppm ASTM D5185(m) <t< td=""><td>•</td><td></td><td>,</td><td></td><td>-</td><td></td><td>0</td></t<>	•		,		-		0
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history3 Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1	Bervllium		. ,		0		
Boron ppm ASTM D5185(m) 3 17 164 Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) >25 3 3 4 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185(m) >20 0 <1 2 Potassium ppm ASTM D5185(m)			. ,				
Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history3 Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) >20 0 <1 6 Fuel % ASTM	ADDITIVES		method	limit/base	current	history1	history2
Barium ppm ASTM D5185(m) <1 0 0 Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) >25 3 3 4 CONTAMINANTS method limit/base current history1 history3 Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) >20 0 <1 6	Boron	mqq	ASTM D5185(m)		3	17	164
Molybdenum ppm ASTM D5185(m) 56 50 5 Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) >20 0 <1 6 Fuel % ASTM D7593* >2.0 3.1 2.7 3.5 INFRA-RED met	Barium		. ,		<1	0	0
Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 1132 1161 1105 Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1	Molybdenum		. ,		56		
Magnesium ppm ASTM D5185(m) 942 848 96 Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 1132 1161 1105 Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1	•		. ,				
Calcium ppm ASTM D5185(m) 1019 1156 1926 Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 1132 1161 1105 Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1	•				-	848	96
Phosphorus ppm ASTM D5185(m) 977 1069 1002 Zinc ppm ASTM D5185(m) 1132 1161 1105 Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1			. ,		-		
Zinc ppm ASTM D5185(m) 1132 1161 1105 Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) >25 3 3 4 Potassium ppm ASTM D5185(m) >20 0 <1			()				
Sulfur ppm ASTM D5185(m) 2577 2724 2933 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) >25 3 3 4 Potassium ppm ASTM D5185(m) >20 0 <1	•						
Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history3 Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) 1 1 2 Potassium ppm ASTM D5185(m) >20 0 <1	-		(/				
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) 1 1 2 Potassium ppm ASTM D5185(m) >20 0 <1			. ,				
Silicon ppm ASTM D5185(m) >25 3 3 4 Sodium ppm ASTM D5185(m) 1 1 2 Potassium ppm ASTM D5185(m) >20 0 <1 6 Fuel % ASTM D7593* >2.0 3.1 2.7 3.5 INFRA-RED method limit/base current history1 history1 Soot % % ASTM D7844* >3 0 0 0 Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3				limit/base			history2
Sodium ppm ASTM D5185(m) 1 1 2 Potassium ppm ASTM D5185(m) >20 0 <1 6 Fuel % ASTM D7593* >2.0 3.1 2.7 3.5 INFRA-RED method limit/base current history1 history Soot % % ASTM D7844* >3 0 0 0 Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3	Silicon	ppm	ASTM D5185(m)	>25	3		
Potassium ppm ASTM D5185(m) >20 0 <1 6 Fuel % ASTM D7593* >2.0 ▲ 3.1 ▲ 2.7 ▲ 3.5 INFRA-RED method limit/base current history1 history Soot % % ASTM D7844* >3 0 0 0 Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3	Sodium		ASTM D5185(m)				2
Fuel % ASTM D7593* >2.0 ▲ 3.1 ▲ 2.7 ▲ 3.5 INFRA-RED method limit/base current history1 history1 Soot % % ASTM D7844* >3 0 0 0 Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3			, ,	>20		<1	
Soot % % ASTM D7844* >3 0 0 0 Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3							
Nitration Abs/cm ASTM D7624* >20 4.5 5.5 5.3	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	ASTM D7844*	>3	0	0	0
	Nitration	Abs/cm	ASTM D7624*	>20	4.5	5.5	5.3
	Sulfation	Abs/.1mm	ASTM D7415*	>30	17.5	19.2	21.2



OIL ANALYSIS REPORT





CALA ISO 17025:2017 Accredited

Laboratory Sample No. Lab Number Unique Number

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : WA0020718

Recieved : 02604023 : 5697108

: 19 Dec 2023 Diagnosed

: 20 Dec 2023 Diagnostician : Wes Davis

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

Wajax Power Systems 70 Raddall Avenue

Dartmouth, NS **CA B3B 1T7** Contact: Danelle Hoffman dhoffman@wajax.com

T: (902)468-6200 F: (902)468-3325