

OIL ANALYSIS REPORT

Sample Rating Trend





Machine Id 4634M Component Diesel Engine

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

PETRO CANADA DIAGNOSIS Recommendation No corrective action is recommended at this time.

Resample at the next service interval to monitor.

Fluid

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

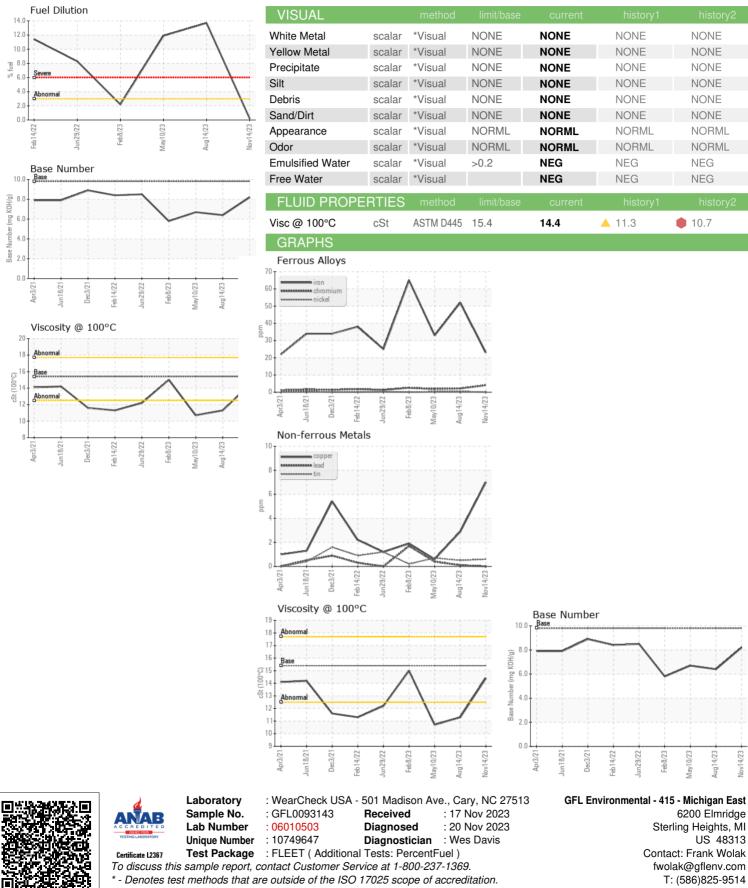
Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Date Client Info 14 Nov 2023 14 Aug 2023 10 May 2023 Machine Age hrs Client Info 20070 19401 18636 Oil Age hrs Client Info 19401 0 18019 Oil Changed Client Info Not Changd Changed SEVERE SEVERE Sample Status Client Info Not Changd Changed SEVERE SEVERE CONTAMINATION method Imit/base current history1 history2 Glycol WC Method NEG NEG NEG VEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >2 0 <1 1 Silver ppm ASTM D5185m >2 0 <1 1 Cadmium ppm ASTM D5185m >2 0 <1 1 Cadm	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 20070 19401 18636 Oil Age hrs Client Info 19401 0 18019 Oil Changed Client Info Not Changd Changed Changed Sample Status Imit/base current history1 history2 Glycol WC Method NEG NEG NEG VEAR METALS method imit/base current history1 history2 Glycol WC Method NEG NEG NEG NEG Tron ppm ASTM D5185m<>90 23 52 33 Chromium ppm ASTM D5185m<>20 4 2 2 Nickel ppm ASTM D5185m<>20 3 3 5 Lead ppm ASTM D5185m 20 3 3 1 Copper pm ASTM D5185m 330 7 3 <1 1 Copper ppm ASTM D5185m 0 0	Sample Number		Client Info		GFL0093143	GFL0086662	GFL0081455
Oil Age hrs Client Info 19401 0 18019 Oil Changed Client Info Not Changed Changed Changed Sample Status Not Changed SEVERE SEVERE CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG NEG NEG NEG Chromium ppm ASTM D5185 >90 23 52 33 Chromium ppm ASTM D5185 >20 4 2 2 Nickel ppm ASTM D5185 >2 0 <1 <1 Auminum ppm ASTM D5185 >2 0 0 0 Auminum ppm ASTM D5185 >20 3 3 5 Lead ppm ASTM D5185 >20 3 <1 <1 Cadmium ppm ASTM D5185 0 <1 <1 <1 Vanadium ppm	Sample Date		Client Info		14 Nov 2023	14 Aug 2023	10 May 2023
Oli Changed Sample Status Client Info Not Changed NORMAL Changed SEVERE Changed SEVERE CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 23 52 33 Chromium ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >2 0 <1 1 Titanium ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >20 3 3 <5 Lead ppm ASTM D5185m >20 3 3 <1 Cadmium ppm ASTM D5185m >15 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ODITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m	Machine Age	hrs	Client Info		20070	19401	18636
Sample Status NORMAL SEVERE SEVERE CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5165m >20 4 2 2 Nickel ppm ASTM D5165m >2 0 <1 <1 Silver ppm ASTM D5165m >2 0 0 0 Aluminum ppm ASTM D5165m >20 3 3 5 Lead ppm ASTM D5165m >20 3 3 5 Lead ppm ASTM D5165m >40 0 <1 1 Capper ppm ASTM D5165m >15 <1 <1 1 Vanadium ppm ASTM D5165m 0 0 0 0 Capper <td< th=""><th>Oil Age</th><th>hrs</th><th>Client Info</th><th></th><th>19401</th><th>0</th><th>18019</th></td<>	Oil Age	hrs	Client Info		19401	0	18019
CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >20 3 3 5 Lead ppm ASTM D5185m >20 3 3 1 Cadmium ppm ASTM D5185m >330 7 3 1 1 Cadmium ppm ASTM D5185m 0 0 0 0 0 ADDTIVES method limit/base current history1 his	Oil Changed		Client Info		Not Changd	Changed	Changed
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185m >90 23 52 33 Chromium ppm ASTM 05185m >20 4 2 2 Nickel ppm ASTM 05185m >2 0 <1 <1 Silver ppm ASTM 05185m >2 0 0 0 Aluminum ppm ASTM 05185m >20 3 3 5 Lead ppm ASTM 05185m >20 3 3 <1 Copper ppm ASTM 05185m >15 <1 <1< <1 Vanadium ppm ASTM 05185m 0 0 0 <1 Cadmium pm ASTM 05185m 0 1 3 2 Barium ppm ASTM 05185m 0 5 48 50	Sample Status				NORMAL	SEVERE	SEVERE
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 23 52 33 Chromium ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >2 0 <1 <1 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Auminum ppm ASTM D5185m >0 <1 <1 1 Copper ppm ASTM D5185m >0 0 <1 <1 Cadmium ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 57 48 5	CONTAMINAT	ION	method	limit/base	current	history1	history2
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Chromium ppm ASTM D5185m >20 4 2 2 Nickel ppm ASTM D5185m >2 0 <1 <1 Titanium ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 3 3 5 Lead ppm ASTM D5185m >20 3 <1 1 Copper ppm ASTM D5185m >40 0 <1 <1 <1 Cadmium ppm ASTM D5185m >15 <1 <1 <1 <1 <1 Cadmium ppm ASTM D5185m 0 1 3 2 3 Barium ppm ASTM D5185m 0 1 3 2 3 Magnesium ppm ASTM D5185m 0 1 3 2 3 Barium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 <1	Iron	ppm	ASTM D5185m	>90	23	52	33
Titanium ppm ASTM D5185m >2 <1	Chromium	ppm	ASTM D5185m	>20	4	2	2
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 3 3 5 Lead ppm ASTM D5185m >40 0 <1 <1 Copper ppm ASTM D5185m >330 7 3 <1 Tin ppm ASTM D5185m >15 <1 <1 <1 Vanadium ppm ASTM D5185m >15 <1 0 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 <1 <1 <1 Maganese ppm ASTM D5185m 0 <1 <1 <1 Maganesium ppm ASTM D5185m 1070 1050 859	Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Aluminum ppm ASTM D5185m >20 3 3 5 Lead ppm ASTM D5185m >40 0 <1 <1 Copper ppm ASTM D5185m >330 7 3 <1 Tin ppm ASTM D5185m >15 <1 <1 <1 Vanadium ppm ASTM D5185m >15 <1 0 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 0 0 0 Magnesium ppm ASTM D5185m 0 1 3 2 Phosphorus ppm ASTM D5185m 1070 1050 859 851 Zinc ppm ASTM D5185m 2060 2306 2910 <th>Titanium</th> <th>ppm</th> <th>ASTM D5185m</th> <th>>2</th> <th><1</th> <th>0</th> <th><1</th>	Titanium	ppm	ASTM D5185m	>2	<1	0	<1
Lead ppm ASTM D5185m >40 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 7 3 <1	Aluminum	ppm	ASTM D5185m	>20	3	3	5
Tin ppm ASTM D5185m >15 <1	Lead	ppm	ASTM D5185m	>40	0	<1	<1
Vanadium ppm ASTM D5185m <1	Copper	ppm	ASTM D5185m	>330	7	3	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 0 0 0 0 Magnaese ppm ASTM D5185m 0 <1	Tin	ppm	ASTM D5185m	>15	<1	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 48 50 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1070 1050 859 887 Phosphorus ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20	Vanadium	ppm	ASTM D5185m		<1	0	<1
Boron ppm ASTM D5185m 0 1 3 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 48 50 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 0 <1 <1 <1 Calcium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1070 1050 859 851 Zinc ppm ASTM D5185m 1150 915 859 851 Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 20	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 48 50 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1070 1050 859 887 Phosphorus ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 57 48 50 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1070 1050 859 887 Phosphorus ppm ASTM D5185m 1070 1050 859 851 Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5324 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base	Boron	ppm	ASTM D5185m	0	1	3	2
Maganese ppm ASTM D5185m 0 <1	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 921 821 787 Calcium ppm ASTM D5185m 1070 1050 859 887 Phosphorus ppm ASTM D5185m 1150 915 859 851 Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 5 5 Sodium ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Sodium ppm ASTM D584 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base curr	Molybdenum	ppm	ASTM D5185m	60	57	48	50
Calcium ppm ASTM D5185m 1070 1050 859 887 Phosphorus ppm ASTM D5185m 1150 915 859 851 Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 5 5 Sodium ppm ASTM D5185m >20 4 2 8 Puel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/.imm *ASTM D7624 >20	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 915 859 851 Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 5 5 Sodium ppm ASTM D5185m >20 4 2 8 Puel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Fuel % ASTM D5185m >20 4 2 8 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/.mm<*ASTM D7624 >20 8.3 13.1	Magnesium	ppm	ASTM D5185m	1010	921	821	787
Zinc ppm ASTM D5185m 1270 1257 1096 1072 Sulfur ppm ASTM D5185m 2060 2306 2910 2999 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 5 5 Sodium ppm ASTM D5185m >20 4 2 8 Potassium ppm ASTM D3524 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.imm *ASTM D7415 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Calcium	ppm	ASTM D5185m	1070	1050	859	887
SulfurppmASTM D5185m2060230629102999CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25655SodiumppmASTM D5185m>20428PotassiumppmASTM D3524>3.00.213.711.9INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>61.11.50.8NitrationAbs/cm*ASTM D7624>208.313.111.0SulfationAbs/1mm*ASTM D7415>3020.524.221.2FLUID DEGRADATION methodlimit/basecurrenthistory1history2	Phosphorus	ppm	ASTM D5185m	1150	915	859	851
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25655SodiumppmASTM D5185m366PotassiumppmASTM D5185m>20428Fuel%ASTM D3524>3.00.213.711.9INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>61.11.50.8NitrationAbs/cm*ASTM D7624>208.313.111.0SulfationAbs/.1mm*ASTM D7415>3020.524.221.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Zinc	ppm	ASTM D5185m	1270	1257	1096	1072
Silicon ppm ASTM D5185m >25 6 5 5 Sodium ppm ASTM D5185m 3 6 6 Potassium ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D3524 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.1mm *ASTM D715 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Sulfur	ppm	ASTM D5185m	2060	2306	2910	2999
Sodium ppm ASTM D5185m 3 6 6 Potassium ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D3524 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.tmm *ASTM D7415 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 4 2 8 Fuel % ASTM D3524 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.imm *ASTM D7415 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Silicon	ppm	ASTM D5185m	>25	6	5	5
Fuel % ASTM D3524 >3.0 0.2 13.7 11.9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.1mm *ASTM D7615 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Sodium	ppm	ASTM D5185m		3	6	6
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>61.11.50.8NitrationAbs/cm*ASTM D7624>208.313.111.0SulfationAbs/.1mm*ASTM D7415>3020.524.221.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Potassium	ppm	ASTM D5185m	>20	4	2	8
Soot % % *ASTM D7844 >6 1.1 1.5 0.8 Nitration Abs/cm *ASTM D7624 >20 8.3 13.1 11.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Fuel	%	ASTM D3524	>3.0	0.2	13.7	11.9
NitrationAbs/cm*ASTM D7624>208.313.111.0SulfationAbs/.1mm*ASTM D7415>3020.524.221.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 20.5 24.2 21.2 FLUID DEGRADATION method limit/base current history1 history2	Soot %	%	*ASTM D7844	>6	1.1	1.5	0.8
FLUID DEGRADATION method limit/base current history1 history2	Nitration	Abs/cm	*ASTM D7624	>20	8.3	13.1	11.0
	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.5	24.2	21.2
	FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Oxidation ADS/.IMM ASIM D/414 >25 15.9 24.4 18.6	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.9	24.4	18.6
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.2 6.4 6.7	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.2	6.4	6.7



OIL ANALYSIS REPORT



Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Submitted By: Frank Wolak

Nov14/23

F:

Aug14/23