

OIL ANALYSIS REPORT

Sample Rating Trend



{UNASSIGNED}

913017 Component Front Diesel Engine

Fluid

___. PETRO CANADA

Sample Number Client Info GFL0088386 GFL0070046 GFL0070045 Sample Date Info 30 Jun 2023 22 May 2023 02 May 2023 Machine Age hrs Client Info 1998 1721 1497 Oil Age hrs Client Info 1721 1721 1721 Oil Changed Client Info N/A Not Changd Not Changd Sample Status Client Info N/A Not Changd Not Changd Glipcol Client Info N/A Not Changd Not Changd Sample Status method Iimit/base current history 1 history 1 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Glycol WC Method >3.0 <1 0 0 0 VEAR METALS method Iimit/base current history 1 history 1 Iron ppm ASTM 05165m >2.0 <1 0 0 Aluminum ppm	ON SHP 15W40 (4	10 QTS)	Dec2022 Jan2	023 Feb2023 Feb2023 Mar	2023 Mar2023 Apr2023 May2023 May	2023 Jun2023	
Sample Date Client Info 30 Jun 2023 22 May 2023 02 May 202 Machine Age hrs Client Info 1998 1721 1497 Oil Age hrs Client Info 1721 1721 1721 Oil Changed Client Info NA Not Changd Not Changd Not Changd Sample Status Client Info NA Not Changd Not Changd Not Changd Gloyal WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Glyaol WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Glyaol WC Method >2.0 7 17 10 <1.0 Chromium ppm ASTM D5185m >2.0 7 0 0 0 <1.0 0 <1.0 0<	SAMPLE INFOF	RMATION	method	limit/base	current	history 1	history 2
Machine Age hrs Client Info 1998 1721 1721 1721 Oil Age hrs Client Info N/A Not Changed Not Changed Sample Status I Imit Age NORMAL NORMAL NORMAL CONTAMINATION method Imit/base current NISGN Allo Fuel WC Method >3.0 <1.0	Sample Number		Client Info		GFL0088386	GFL0070046	GFL007004
Oil Age hrs Client Info 1721 1721 1721 1721 1721 Oil Changed Client Info NA Not Changd Not Changd Not Changd Sample Status Imilibase current history 1 history 1 Fuel WC Method >3.0 <1.0	Sample Date		Client Info		30 Jun 2023	22 May 2023	02 May 2023
Oil Age hrs Client Info 1721 1721 1721 1721 1721 Oil Changed Client Info NA Not Changed Not Changed Sample Status Imitibase current history 1 history 1 Fuel WC Method >3.0 <1.0	Machine Age	hrs	Client Info		1998	1721	1497
Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history 1 history 1 Fuel WC Method >3.0 <1.0		hrs	Client Info		1721	1721	1721
Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history 1 history 1 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		N/A	Not Changd	Not Changd
Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 <1.0 Glycol WC Method Imit/base current NEG NEG WEAR METALS method limit/base current history 1 history 1 Iron ppm ASTM D5185m >12.0 7 17 10 Chromium ppm ASTM D5185m >2.0 <1 2.1 0 0 Nickel ppm ASTM D5185m >2.2 0 0 0 0 Aluminum ppm ASTM D5185m >2.0 0 0 0 0 Copper ppm ASTM D5185m >2.0 0 0 0 0 Vanadium ppm ASTM D5185m >2.0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 0<	-				NORMAL		
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history 1 history 1 Iron ppm ASTM D5185m >20 <1	CONTAMINA	ΓΙΟΝ	method	limit/base	current	history 1	history 2
WEAR METALS method imit/base current history 1 history 2 Iron ppm ASTM D5185m >120 7 17 10 Chromium ppm ASTM D5185m >20 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Iron ppm ASTM D5185m >120 7 177 10 Chromium ppm ASTM D5185m >20 <1	Glycol		WC Method			NEG	NEG
Chromium ppm ASTM D5185m >20 <1 0 0 Nickel ppm ASTM D5185m >5 <1	WEAR METAI	_S	method	limit/base	current	history 1	history 2
Nickel ppm ASTM D5185m >5 <1 2 <1 Titanium ppm ASTM D5185m >2 <1	Iron	ppm	ASTM D5185m	>120	7	17	10
Titanium ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 0 2 5 Lead ppm ASTM D5185m >30 5 39 41 Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Chromium	ppm	ASTM D5185m	>20	<1	0	0
Silver ppm ASTM D5185m >20 0 0 0 Aluminum ppm ASTM D5185m >20 0 2 5 Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Nickel	ppm	ASTM D5185m	>5	<1	2	<1
Aluminum ppm ASTM D5185m >20 0 2 5 Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Titanium	ppm	ASTM D5185m	>2	<1	0	0
Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>20	0	2	5
Copper ppm ASTM D5185m >330 5 39 41 Tin ppm ASTM D5185m >15 <1	Lead	ppm	ASTM D5185m	>40	0	0	0
Tin ppm ASTM D5185m >15 <1 <1 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Boron ppm ASTM D5185m 0 0 0 <1	Copper	ppm	ASTM D5185m	>330	5	39	41
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history 1 history 2 Boron ppm ASTM D5185m 0 0 0 0 0 1 Barium ppm ASTM D5185m 0 0 0 0 0 0 Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 0 <1 <1 0 Calcium ppm ASTM D5185m 0 <1123 1111 1134 Phosphorus ppm ASTM D5185m 150 1011 972 1060 Zinc ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 206 3647 3236 3388 CONTAMINANTS method <td></td> <td></td> <td></td> <td></td> <td><1</td> <td><1</td> <td>0</td>					<1	<1	0
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history 1 history 2 Boron ppm ASTM D5185m 0 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 0 0 Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 0 <1 <1 0 Calcium ppm ASTM D5185m 0 <1 <1 0 Calcium ppm ASTM D5185m 1010 961 957 1018 Calcium ppm ASTM D5185m 1070 1123 11111 1134 Phosphorus ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method <t< td=""><td>Vanadium</td><td></td><td>ASTM D5185m</td><td></td><td><1</td><td>0</td><td>0</td></t<>	Vanadium		ASTM D5185m		<1	0	0
Boron ppm ASTM D5185m 0 0 0 0 <1 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 58 61 Manganese ppm ASTM D5185m 0 <1	Cadmium						
Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 58 61 Manganese ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history 1	history 2
Molybdenum ppm ASTM D5185m 60 57 58 61 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	0	0	<1
Marganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1010 961 957 1018 Calcium ppm ASTM D5185m 1070 1123 1111 1134 Phosphorus ppm ASTM D5185m 1070 1123 1111 1134 Phosphorus ppm ASTM D5185m 1070 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/(mm *ASTM D7	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 961 957 1018 Calcium ppm ASTM D5185m 1070 1123 1111 1134 Phosphorus ppm ASTM D5185m 1070 1123 1111 1134 Phosphorus ppm ASTM D5185m 1150 1011 972 1060 Zinc ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.mm *AS	Molybdenum	ppm	ASTM D5185m	60	57	58	61
Calcium ppm ASTM D5185m 1070 1123 1111 1134 Phosphorus ppm ASTM D5185m 1150 1011 972 1060 Zinc ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >20 2 2 <1	Manganese	ppm	ASTM D5185m	0	<1	<1	0
Phosphorus ppm ASTM D5185m 1150 1011 972 1060 Zinc ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/cm *ASTM D7414 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method lim	Magnesium	ppm	ASTM D5185m	1010	961	957	1018
Zinc ppm ASTM D5185m 1270 1257 1231 1317 Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Potassium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/cm *ASTM D7615 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.tmm *ASTM D7414	Calcium	ppm	ASTM D5185m	1070	1123	1111	1134
Sulfur ppm ASTM D5185m 2060 3647 3236 3388 CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Potassium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.tmm *ASTM D7624 >20 6.1 7.6 6.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.tmm *ASTM D7414 >25 14.4 15.4 14.6	Phosphorus	ppm	ASTM D5185m	1150	1011	972	1060
CONTAMINANTS method limit/base current history 1 history 2 Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Zinc	ppm	ASTM D5185m	1270	1257	1231	1317
Silicon ppm ASTM D5185m >25 3 6 4 Sodium ppm ASTM D5185m <1 2 <1 2 <1 Potassium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7615 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Sulfur	ppm	ASTM D5185m	2060	3647	3236	3388
Sodium ppm ASTM D5185m <1 2 <1 Potassium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	CONTAMINA	NTS	method	limit/base	current	history 1	history 2
Potassium ppm ASTM D5185m >20 2 2 5 INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Silicon	ppm	ASTM D5185m	>25	3	6	4
INFRA-RED method limit/base current history 1 history 2 Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Sodium	ppm	ASTM D5185m		<1	2	<1
Soot % % *ASTM D7844 >4 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Potassium	ppm	ASTM D5185m	>20	2	2	5
Nitration Abs/cm *ASTM D7624 >20 6.1 7.6 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	INFRA-RED		method	limit/base	current	history 1	history 2
Sulfation Abs/.1mm *ASTM D7415 >30 19.3 20.4 19.6 FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Soot %	%	*ASTM D7844	>4	0.2	0.3	0.2
FLUID DEGRADATION method limit/base current history 1 history 2 Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Nitration	Abs/cm	*ASTM D7624	>20	6.1	7.6	6.6
Oxidation Abs/.1mm *ASTM D7414 >25 14.4 15.4 14.6	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.3	20.4	19.6
	FLUID DEGRA	DATION	method	limit/base	current	history 1	history 2
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.7 8.2 8.4		Abs/.1mm	*ASTM D7414	>25	14.4	15.4	14.6
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.7	8.2	8.4

DIAGNOSIS Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

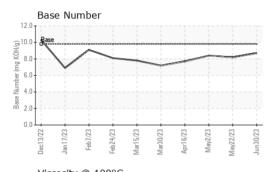
There is no indication of any contamination in the oil.

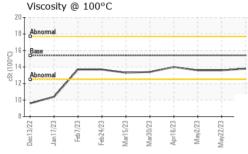
Fluid Condition

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

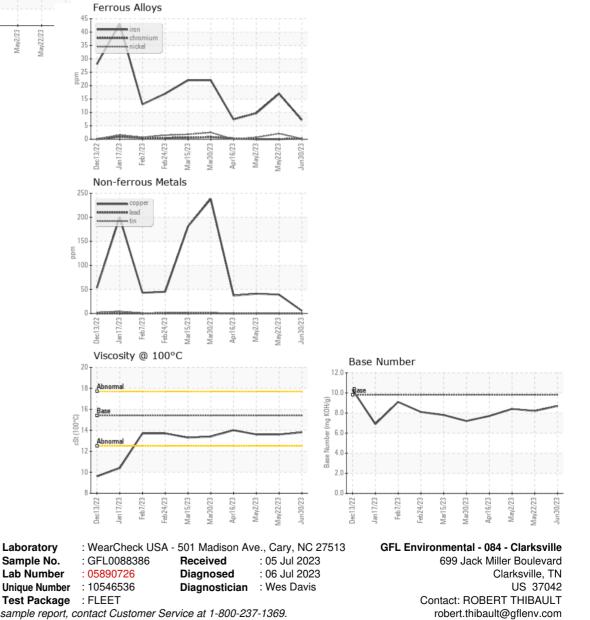


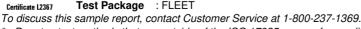
OIL ANALYSIS REPORT





VISUAL		method	limit/base	current	history 1	history 2
White Metal	scalar	*Visual	NONE	NONE	LIGHT	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	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 PROPE	RTIES	method	limit/base	current	history 1	history 2
Visc @ 100°C	cSt	ASTM D445	15.4	13.8	13.6	13.6
GRAPHS						





* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

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

Submitted By: ROBERT THIBAULT

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