

OIL ANALYSIS REPORT

Sample Rating Trend

VISCOSITY

Machine Id **2870**

Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (7 GAL)

DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. 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.

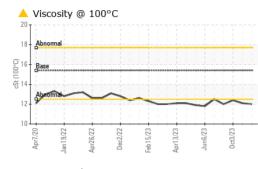
Fluid Condition

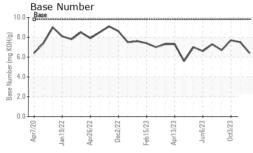
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

SAMPLE INFORMATION method limit/base current history1 history2 Sample Number Client Info GFL0107253 GFL0080872 GFL0094371 Bitory1 history1 Sample Date Client Info GFL0107253 GFL0094371 Bitory1 Bitory1 Bitory1 Bitory1 Bitory1 Bitory1 Bitory1 Bitory1 Not Changd Oil Age hrs Client Info S52 296 Not Changd Sample Status Client Info Changed Not Changd Not Changd Sample Status Imit/base current History1 History1 Water WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG Neg Vickel ppm ASTM D5165m<>165 17 6 4 0 1 0 Silver ppm ASTM D5165m<>150 -1 1 -1 0 Silver ppm ASTM D5165m	AL)						
Sample Number Client Info GFL0107253 GFL0080872 GFL0094341 Sample Date Client Info 29 Dec 2023 23 Oct 2023 00 Oct 2023 Machine Age hrs Client Info 552 296 152 Oil Age Client Info Changed Not Changd Not Changd Sample Status Immethod Immit/base current History1 History2 CONTAMINATION method January ATTENTION ATTENTION NOFMAL CONTAMINATION method Immit/base current History1 History2 Fuel WC Method >0.2 NEG NEG NEG Water WC Method >0.2 NEG NEG NEG Nickel ppm ASTM D51655 >4 0 <1 0 Nickel ppm ASTM D51655 >20 0 0 0 Nickel ppm ASTM D51655 >20 4 2 2 2 Lead	,	MATION	method	022 Apr2022 Dec2022	Feb2023 Apr2023 Jun2023	0ct2023	history2
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Sample Status ATTENTION ATTENTION NORMAL CONTAMINATION method imil/base current history1 history2 Fuel WC Method >3.0 <1.0	•						
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Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imil/base current history1 history2 Iron ppm ASTM D5185m >165 17 6 4 Chromium ppm ASTM D5185m >5 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >165 17 6 4 Chromium ppm ASTM D5185m >5 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >165 17 6 4 Chromium ppm ASTM D5185m >5 <1	Water		WC Method	>0.2	NEG	NEG	NEG
ron ppm ASTM D5185m >165 17 6 4 Chromium ppm ASTM D5185m >5 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >5 <1 <1 0 Nickel ppm ASTM D5185m >4 0 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >4 0 <1 0 Titanium ppm ASTM D5185m >2 0 <1	Iron	ppm	ASTM D5185m	>165	17	6	4
Titanium ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >20 4 2 2 Lead ppm ASTM D5185m >150 <1	Chromium	ppm	ASTM D5185m	>5	<1	<1	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 4 2 2 Lead ppm ASTM D5185m >150 <1 1 <1 Copper ppm ASTM D5185m >90 100 7 5 Tin ppm ASTM D5185m >5 <1 <1 <1 <1 Vanadium ppm ASTM D5185m >5 <1 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 <10 10 13 Cadmium ppm ASTM D5185m 0 10 10 13 Baron ppm ASTM D5185m 0 0 10 10 13 Barium ppm ASTM D5185m 0 10 822 749 887 Calcium ppm ASTM D5185m 1010 822 749 887	Nickel	ppm	ASTM D5185m	>4	0	<1	0
Aluminum ppm ASTM D5185m >20 4 2 2 Lead ppm ASTM D5185m >150 <1	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead ppm ASTM D5185m >150 <1 1 <1 Copper ppm ASTM D5185m >90 10 7 5 Tin ppm ASTM D5185m >5 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >90 10 7 5 Tin ppm ASTM D5185m >5 <1	Aluminum	ppm	ASTM D5185m	>20	4	2	2
Tin ppm ASTM D5185m >5 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 <1	Lead	ppm	ASTM D5185m	>150	<1	1	<1
Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 <1	Copper	ppm	ASTM D5185m	>90	10	7	5
Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 10 10 13 Barium ppm ASTM D5185m 0 0 10 10 13 Barium ppm ASTM D5185m 0 0 10 10 0 Magnesium ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 0 <1 0 <1 Calcium ppm ASTM D5185m 1010 822 749 887 Calcium ppm ASTM D5185m 1070 1053 1063 1164 Phosphorus ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base	Tin	ppm	ASTM D5185m	>5	<1	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 10 10 13 Barium ppm ASTM D5185m 0 0 10 0 Molybdenum ppm ASTM D5185m 0 61 64 64 Magnesium ppm ASTM D5185m 0 <1	Vanadium	ppm	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 0 10 10 13 Barium ppm ASTM D5185m 0 0 10 0 Molybdenum ppm ASTM D5185m 60 61 64 64 Manganese ppm ASTM D5185m 0 <1	Cadmium	ppm	ASTM D5185m		0	<1	0
Barium ppm ASTM D5185m 0 0 10 0 Molybdenum ppm ASTM D5185m 60 61 64 64 Manganese ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 61 64 64 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	10	10	13
Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 822 749 887 Calcium ppm ASTM D5185m 1070 1053 1063 1164 Phosphorus ppm ASTM D5185m 1070 1053 1063 1164 Phosphorus ppm ASTM D5185m 1150 980 829 992 Zinc ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844	Barium	ppm	ASTM D5185m	0	0	10	0
Magnesium ppm ASTM D5185m 1010 822 749 887 Calcium ppm ASTM D5185m 1070 1053 1063 1164 Phosphorus ppm ASTM D5185m 1150 980 829 992 Zinc ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Stiration Abs/.mm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.mm *ASTM D741	Molybdenum	ppm	ASTM D5185m	60	61	64	64
Calcium ppm ASTM D5185m 1070 1053 1063 1164 Phosphorus ppm ASTM D5185m 1150 980 829 992 Zinc ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method <	Manganese	ppm	ASTM D5185m	0	<1	0	<1
Phosphorus ppm ASTM D5185m 1150 980 829 992 Zinc ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Soot % % *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.mm *ASTM D7644 >20 8.8 17.9 17.1 FLUID DEGRADATION method limit/base2	Magnesium	ppm	ASTM D5185m	1010	822	749	887
Zinc ppm ASTM D5185m 1270 1126 1109 1221 Sulfur ppm ASTM D5185m 2060 2619 3008 2918 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Soot % % *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/cm *ASTM D7624 >20 8.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414	Calcium	ppm	ASTM D5185m	1070	1053	1063	1164
SulfurppmASTM D5185m2060261930082918CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>35543SodiumppmASTM D5185m>35543PotassiumppmASTM D5185m>20586INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>7.50.50.30.2NitrationAbs/cm*ASTM D7624>208.87.16.1SulfationAbs/.1mm*ASTM D7615>3018.817.917.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2514.613.212.5	Phosphorus	ppm	ASTM D5185m	1150	980	829	992
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>35543SodiumppmASTM D5185m>35543PotassiumppmASTM D5185m>20586INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>7.50.50.30.2NitrationAbs/cm*ASTM D7624>208.87.16.1SulfationAbs/.1mm*ASTM D7615>3018.817.917.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2514.613.212.5	Zinc	ppm	ASTM D5185m	1270	1126	1109	1221
Silicon ppm ASTM D5185m >35 5 4 3 Sodium ppm ASTM D5185m >35 4 0 4 Potassium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Soot % % *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/cm *ASTM D7624 >20 8.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Sulfur	ppm	ASTM D5185m	2060	2619	3008	2918
Sodium ppm ASTM D5185m 4 0 4 Potassium ppm ASTM D5185m<>20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 5 8 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5		ppm	ASTM D5185m	>35	5	4	3
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Sodium	ppm	ASTM D5185m		4	0	4
Soot % % *ASTM D7844 >7.5 0.5 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Potassium	ppm	ASTM D5185m	>20	5	8	6
Nitration Abs/cm *ASTM D7624 >20 8.8 7.1 6.1 Sulfation Abs/.1mm *ASTM D7615 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	INFRA-RED			limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 18.8 17.9 17.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Soot %	%	*ASTM D7844	>7.5	0.5	0.3	0.2
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Nitration	Abs/cm	*ASTM D7624	>20	8.8	7.1	6.1
Oxidation Abs/.1mm *ASTM D7414 >25 14.6 13.2 12.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.8	17.9	17.1
	FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 6.4 7.5 7.7							
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	6.4	7.5	7.7

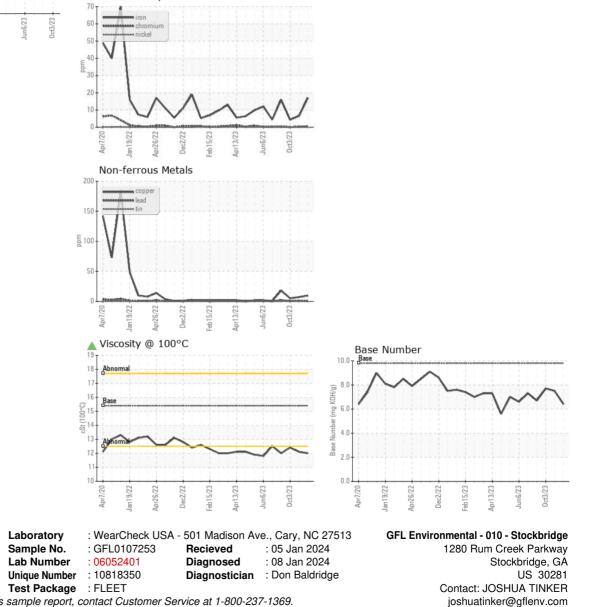


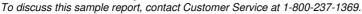
OIL ANALYSIS REPORT





VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	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	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	12.0	▲ 12.1	12.4
GRAPHS						
Ferrous Alloys						





* - 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)

Certificate L2367

Submitted By: JOSHUA TINKER

Т:

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