

OIL ANALYSIS REPORT

Sample Rating Trend

FUEL

729043-361418

Component Diesel Engine

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

DIAGNOSIS

Recommendation

We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

Contamination

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

Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

Sample Number Client Info GFL0195299 GFL0098765 GFL0098765 GFL0098765 Sample Date irs Client Info 10473 144 18 5108 Machine Age hrs Client Info 10473 14418 5108 Oil Age irs Client Info 300 150 150 Oil Changed Irs Client Info Mot Changd Not Changd Not Changd Sample Status Irs Client Info Molt Machine ABNORMAL ABNORMAL Not Changd Water WC Method >0.2 NEG NEG NEG NEG Water WC Method >0.2 NEG NEG NEG Chromium ppm ASTM D5185m >100 10 18 3 Silver ppm ASTM D5185m >40 0 0 0 Silver ppm ASTM D5185m >20 2 <1	iAL)		Dec2022	Feb2023 May2023	Oct2023 Dec2023	Feb2024	
Sample Date Image of the second	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 10473 14418 5108 Oil Age hrs Client Info 300 150 150 Oil Changed Client Info Not Changd Not Changd Not Changd Not Changd Sample Status Client Info MBNORMAL ABNORMAL Nort Changd Nort Changd Nort Changd Water WC Method >0.2 NEG NEG NEG Water WC Method >0.2 NEG NEG NEG Water WC Method >0.2 NEG NEG NEG Vickel ppm ASTM D5185m >100 10 18 3 Itrainium ppm ASTM D5185m >20 <1	Sample Number		Client Info		GFL0105209	GFL0098765	GFL0065492
Oil Age hrs Client Info 300 150 150 Oil Changed Client Info Not Changd Not Changd Not Changd Not Changd Sample Status Imit/base current history1 history1 Water WC Method NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method Imit/base current history1 history1 Iron ppm ASTM D5185m >100 10 18 3 Chromium ppm ASTM D5185m >20 <1	Sample Date		Client Info		14 Feb 2024	22 Dec 2023	13 Dec 2023
Oil Changed Sample Status Client Info Not Changd ABNORMAL Not Changd ABNORMAL Not Changd ABNORMAL Not Changd ABNORMAL Not Changd NORMAL CONTAMINATION method limit/base current history1 history1 Water WC Method >0.2 NEG NEG NEG NEG Wear WC Method >0.2 NEG NEG NEG NEG Wear WC Method >0.0 10 18 3 Iron ppm ASTM D5185m >10.0 10 18 3 Iron ppm ASTM D5185m >3 0 0 0 Not Change ppm ASTM D5185m >3 0 0 0 Istory1 ASTM D5185m >40 2 <1 0 0 Gopper ppm ASTM D5185m >33.0 2 3 0 0 Astm D5185m 0 3 0 1 1 1 1 1 1	Machine Age	hrs	Client Info		10473	14418	5108
Sample Status Method Imit/base Current history1 NoRMAL CONTAMINATION method limit/base current history1 history1 Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imit/base current history1 history1 VEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185n >100 10 18 3 Chromium ppm ASTM D5185n >4 <1	Oil Age	hrs	Client Info		300	150	150
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG Water WC Method NEG NEG NEG Wear ppm ASTM D5185m >100 10 18 3 Chromium ppm ASTM D5185m >20 <1	Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imit/base current history1 history1 WEAR METALS method Imit/base current history1 history1 Iron ppm ASTM D5185m >20 <1	Sample Status				ABNORMAL	ABNORMAL	NORMAL
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >100 10 18 3 Chromium ppm ASTM D5185m >20 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron ppm ASTM D5185m >100 10 18 3 Chromium ppm ASTM D5185m >20 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1	WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >4 <1 0 0 Titanium ppm ASTM D5185m >3 0 0 0 Silver ppm ASTM D5185m >20 2 2 <1	Iron	ppm	ASTM D5185m	>100	10	18	3
Titanium ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >20 2 2 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	0
Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >20 2 2 <1 Lead ppm ASTM D5185m >40 2 3 <1 Copper ppm ASTM D5185m >330 2 3 <1 Vanadium ppm ASTM D5185m >15 <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 <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 <t< td=""><td>Nickel</td><td>ppm</td><td>ASTM D5185m</td><td>>4</td><td><1</td><td>0</td><td>0</td></t<>	Nickel	ppm	ASTM D5185m	>4	<1	0	0
Aluminum ppm ASTM D5185m >20 2 2 <1 Lead ppm ASTM D5185m >40 2 <1	Titanium	ppm	ASTM D5185m		0	0	0
Lead ppm ASTM D5185m >40 2 <1 0 Copper ppm ASTM D5185m >330 2 3 <1	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper ppm ASTM D5185m >330 2 3 4 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>20	2	2	<1
Tin ppm ASTM D5185m >15 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 3 0 1 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 61 53 60 52 Magnesium ppm ASTM D5185m 010 838 901 878 Calcium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m >25<	Lead	ppm	ASTM D5185m	>40	2	<1	0
Tin ppm ASTM D5185m >15 <1 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 3 0 1 Barium ppm ASTM D5185m 0 3 0 1 Magnese ppm ASTM D5185m 0 53 60 52 Magnesium ppm ASTM D5185m 0 <1	Copper	ppm	ASTM D5185m	>330	2	3	<1
Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 3 0 1 Barium ppm ASTM D5185m 0 0 0 0 0 Magnese ppm ASTM D5185m 0 0 <1 0 <1 Magnesium ppm ASTM D5185m 0 <10 838 901 878 Calcium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 265 2 4 2 Sodium ppm ASTM D5185m		ppm	ASTM D5185m	>15	<1	<1	<1
ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 3 0 1 Barium ppm ASTM D5185m 0 0 0 0 Magnese ppm ASTM D5185m 60 53 60 52 Magnesium ppm ASTM D5185m 0 <1	Vanadium		ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 3 0 1 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 60 53 60 52 Manganese ppm ASTM D5185m 0 <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 53 60 52 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history2 Solicon ppm ASTM D5185m >20 1 12 <1 Fuel % ASTM D5185m	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 53 60 52 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	3	0	1
Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1150 918 939 922 Zinc ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >20 1 12 <1 Fuel % ASTM D5185m >20 1 12 <1 <1 Soot % % *ASTM D5824 >5 5.4 <1.0 <1.0 <10 <10	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 838 901 878 Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1150 918 939 922 Zinc ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >20 1 12 <1	Molybdenum	ppm	ASTM D5185m	60	53	60	52
Calcium ppm ASTM D5185m 1070 905 1013 937 Phosphorus ppm ASTM D5185m 1150 918 939 922 Zinc ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >20 1 12 -1 Potassium ppm ASTM D5185m >20 1 12 <1	Manganese	ppm	ASTM D5185m	0	<1	0	<1
Phosphorus ppm ASTM D5185m 1150 918 939 922 Zinc ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >20 1 12 1 Potassium ppm ASTM D5185m >20 1 12 <1	Magnesium	ppm	ASTM D5185m	1010	838	901	878
Zinc ppm ASTM D5185m 1270 1137 1152 1173 Sulfur ppm ASTM D5185m 2060 2775 3061 2847 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >20 1 12 <1	Calcium	ppm	ASTM D5185m	1070	905	1013	937
SulfurppmASTM D5185m2060277530612847CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25242SodiumppmASTM D5185m>25242SodiumppmASTM D5185m>20112<1	Phosphorus	ppm	ASTM D5185m	1150	918	939	922
CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m >25 2 4 2 Potassium ppm ASTM D5185m >20 1 12 <1	Zinc	ppm	ASTM D5185m	1270	1137	1152	1173
Silicon ppm ASTM D5185m >25 2 4 2 Sodium ppm ASTM D5185m 5 28 1 Potassium ppm ASTM D5185m >20 1 12 <1 Fuel % ASTM D3524 >5 ▲ 5.4 <1.0 <1.0 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.4 ▲ 3.7 0.3 Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Sulfur	ppm	ASTM D5185m	2060	2775	3061	2847
Sodium ppm ASTM D5185m 5 28 1 Potassium ppm ASTM D5185m<>20 1 12 <1	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 1 12 <1 Fuel % ASTM D3524 >5 ▲ 5.4 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.4 ▲ 3.7 0.3 Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Silicon	ppm	ASTM D5185m	>25	2	4	2
Fuel % ASTM D3524 >5 5.4 <1.0 <1.0 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.4 3.7 0.3 Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Sodium	ppm	ASTM D5185m		5	28	1
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.4 ▲ 3.7 0.3 Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Potassium	ppm	ASTM D5185m	>20	1	12	<1
Soot % % *ASTM D7844 >3 0.4 3.7 0.3 Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Fuel	%	ASTM D3524	>5	<u> </u>	<1.0	<1.0
Nitration Abs/cm *ASTM D7624 >20 7.1 9.3 5.8 Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 18.5 25.4 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Soot %	%	*ASTM D7844	>3	0.4	3 .7	0.3
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Nitration	Abs/cm	*ASTM D7624	>20	7.1	9.3	5.8
Oxidation Abs/.1mm *ASTM D7414 >25 14.3 15.6 13.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.5	25.4	18.1
	FLUID DEGRAI		method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.4 8.2 8.2	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.3	15.6	13.5
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.4	8.2	8.2



(mg KOH/g)

Number (i

Base

6.0

4.0

0.0 Dec1/22 -

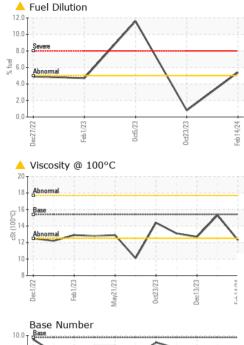
Feb1/23

Mav21/23

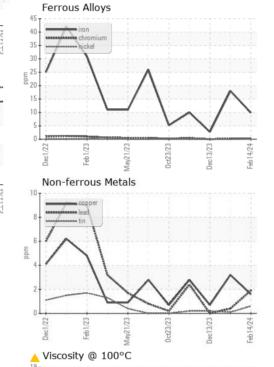
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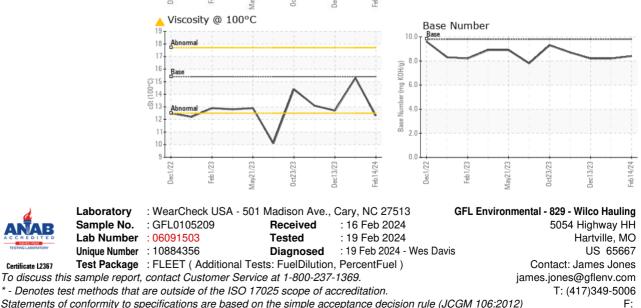
Laboratory Sample No.

OIL ANALYSIS REPORT

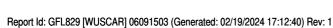


			1			
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	12.3	15.3	12.7
GRAPHS						





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



Submitted By: GFL821, GFL824 and GFL829 - Landen Johnson