

OIL ANALYSIS REPORT

Sample Rating Trend





Machine Id 913039

Fluid

Component
Diesel Engine

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

Sample Number Client Info GFL0107689 GFL010718 GFL017018 GFL017018	•		Feb2023	May2023	Aug2023 Dec2023	Jan2024	
Sample Date Client Info 16 Jan 2024 07 Dec 2023 01 Au Machine Age hrs Client Info 3605 3292 2226 Oil Age hrs Client Info 600 600 600 Oil Changed Client Info 600 600 600 600 Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method Intitbase current history1 in Iron ppm ASTM D5165m<>20 2 0 1 Iron ppm ASTM D5165m<>20 2 0 1 Iron ppm ASTM D5165m<>20 2 1 <1 Iron ppm ASTM D5165m<>20 2 1 <1 Iron ppm ASTM D5165m<>20 2 1 <1	SAMPLE INFOR	MATION	method	limit/base	current	history1	history
Machine Age hrs Client Info 3605 3292 2226 Oil Age hrs Client Info 600 600 600 Oil Changed Client Info Changed N/A Changed Sample Status Imit/base current history1 n Fuel WC Method >3.0 <1.0	Sample Number		Client Info		GFL0107689	GFL0107018	GFL008279
Oil Age hrs Client Info 600 600 600 Oil Changed Client Info Changed N/A Changed Sample Status Imathematical Contract NORMAL NORMAL NORMAL NORMAL CONTAMINATION method Imit/base current history1 H Fuel WC Method >3.0 <1.0	Sample Date		Client Info		16 Jan 2024	07 Dec 2023	01 Aug 202
Oil Changed Client Info Changed NORMAL N/A Changed NORMAL N/A Changed NORMAL N/A Changed NORMAL N/A NoRMAL	Machine Age	hrs	Client Info		3605	3292	2226
Sample Status Imathe Indit Vase NORMAL NORMAL NORMAL CONTAMINATION method imit/base current history1 history1 Fuel WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG WEAR METALS method imit/base current history1 history1 Iron ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >20 2 1 0 Nickel ppm ASTM D5185m >20 2 1 0 Nickel ppm ASTM D5185m >20 2 1 0 Silver ppm ASTM D5185m >20 2 1 0 0 Cadmium ppm ASTM D5185m >330 12 2 0 1 Vanadium ppm ASTM D5185m 0 <1	Oil Age	hrs	Client Info		600	600	600
CONTAMINATION method limit/base current history1 history1 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Changed	N/A	Changed
Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 h Iron ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 1 <1	CONTAMINAT	ION	method	limit/base	current	history1	history
Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 h Iron ppm ASTM D5185m >120 48 7 20 Chromium ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >20 2 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 1 -1 Lead ppm ASTM D5185m >20 2 1 0 Copper ppm ASTM D5185m >15 2 0 -1 Vanadium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 h Boron ppm ASTM D5185m 0 2 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 h Iron ppm ASTM D5185m >120 48 7 20 Chromium ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 1 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron ppm ASTM D5185m >120 48 7 20 Chromium ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 1 0 0 Lead ppm ASTM D5185m >20 2 1 1 1 Lead ppm ASTM D5185m >40 1 1 1 1 1 1 0 <	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 2 0 1 Nickel ppm ASTM D5185m >5 7 3 1 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 -1 0 -1 Aluminum ppm ASTM D5185m >20 2 1 -1 0 Copper ppm ASTM D5185m >20 2 10 -1 0 Copper ppm ASTM D5185m >330 12 2 10 -1 Vanadium ppm ASTM D5185m >15 2 0 -1 0	WEAR METAL	S	method	limit/base	current	history1	history
Nickel ppm ASTM D5185m >5 7 3 1 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 <1	Iron	ppm	ASTM D5185m	>120	48	7	20
Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 <1	Chromium	ppm	ASTM D5185m	>20	2	0	1
Silver ppm ASTM D5185m >2 <1 0 <1 Aluminum ppm ASTM D5185m >20 2 1 <1	Nickel	ppm	ASTM D5185m	>5	7	3	1
Aluminum ppm ASTM D5185m >20 2 1 <1 Lead ppm ASTM D5185m >40 <1	Titanium	ppm	ASTM D5185m	>2	0	0	0
Lead ppm ASTM D5185m >40 <1 <10 0 Copper ppm ASTM D5185m >330 12 2 10 Tin ppm ASTM D5185m >15 2 0 <1	Silver	ppm	ASTM D5185m	>2	<1	0	<1
Copper ppm ASTM D5185m >330 12 2 10 Tin ppm ASTM D5185m >15 2 0 <1	Aluminum	ppm	ASTM D5185m	>20	2	1	<1
Copper ppm ASTM D5185m >330 12 2 10 Tin ppm ASTM D5185m >15 2 0 <1	Lead		ASTM D5185m	>40	<1	<1	0
Tin ppm ASTM D5185m >15 2 0 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 2 <1	Copper		ASTM D5185m	>330	12		10
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 h Boron ppm ASTM D5185m 0 2 <1 3 Barium ppm ASTM D5185m 0 <1 0 0 Molybdenum ppm ASTM D5185m 0 <1 0 0 Magnesium ppm ASTM D5185m 0 2 0 <1 Magnesium ppm ASTM D5185m 0 2 0 <1 Phosphorus ppm ASTM D5185m 1010 929 1039 950 Zinc ppm ASTM D5185m 1070 1029 1178 100 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history							<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 h Boron ppm ASTM D5185m 0 2 <1	Vanadium		ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 2 <1 3 Barium ppm ASTM D5185m 0 <1							
Barium ppm ASTM D5185m 0 <1 0 0 Molybdenum ppm ASTM D5185m 60 61 56 53 Manganese ppm ASTM D5185m 0 2 0 <1	ADDITIVES		method	limit/base	current	history1	history
Molybdenum ppm ASTM D5185m 60 61 56 53 Manganese ppm ASTM D5185m 0 2 0 <1	Boron	ppm	ASTM D5185m	0	2	<1	3
Marganese ppm ASTM D5185m 0 2 0 <1 Magnesium ppm ASTM D5185m 1010 929 1039 956 Calcium ppm ASTM D5185m 1070 1029 1178 102 Phosphorus ppm ASTM D5185m 1070 1029 1178 102 Zinc ppm ASTM D5185m 1150 989 1078 950 Zinc ppm ASTM D5185m 1270 1229 1244 128 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1	Barium	ppm	ASTM D5185m	0	<1	0	0
Magnesium ppm ASTM D5185m 1010 929 1039 950 Calcium ppm ASTM D5185m 1070 1029 1178 1070 Phosphorus ppm ASTM D5185m 1150 989 1078 950 Zinc ppm ASTM D5185m 1270 1229 1244 128 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1	Molybdenum	ppm	ASTM D5185m	60	61	56	53
Calcium ppm ASTM D5185m 1070 1029 1178 1027 Phosphorus ppm ASTM D5185m 1150 989 1078 950 Zinc ppm ASTM D5185m 1270 1229 1244 128 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1	Manganese	ppm	ASTM D5185m	0	2	0	<1
Phosphorus ppm ASTM D5185m 1150 989 1078 950 Zinc ppm ASTM D5185m 1270 1229 1244 128 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1 2 Potassium ppm ASTM D5185m >20 1 <1 4 INFRA-RED method limit/base current history1 h Soot % % *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/cm *ASTM D7414 >20 12.1 6.7 8.6 LUID DEGRADATION method limit/base current	Magnesium	ppm	ASTM D5185m	1010	929	1039	956
Zinc ppm ASTM D5185m 1270 1229 1244 124 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1	Calcium	ppm	ASTM D5185m	1070	1029	1178	1027
Zinc ppm ASTM D5185m 1270 1229 1244 124 Sulfur ppm ASTM D5185m 2060 2270 3113 316 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1	Phosphorus	ppm	ASTM D5185m	1150	989	1078	950
Sulfur ppm ASTM D5185m 2060 2270 3113 310 CONTAMINANTS method limit/base current history1 h Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m >20 1 <1			ASTM D5185m	1270	1229	1244	1281
Silicon ppm ASTM D5185m >25 6 5 4 Sodium ppm ASTM D5185m <20 5 <1 2 Potassium ppm ASTM D5185m >20 1 <1 4 INFRA-RED method limit/base current history1 h Soot % % *ASTM D7624 >4 1.7 0.4 0.9 Nitration Abs/cm *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/.1mm *ASTM D7624 >20 12.1 6.7 8.6 FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7614 >25 20.1 14.2 16.	Sulfur						3168
Sodium ppm ASTM D5185m 5 <1 2 Potassium ppm ASTM D5185m >20 1 <1	CONTAMINAN	ITS	method	limit/base	current	history1	history
Potassium ppm ASTM D5185m >20 1 <1 4 INFRA-RED method limit/base current history1 h Soot % % *ASTM D7844 >4 1.7 0.4 0.9 Nitration Abs/cm *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 25.0 18.6 20.1 FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.7	Silicon	ppm	ASTM D5185m	>25	6	5	4
INFRA-RED method limit/base current history1 h Soot % % *ASTM D7844 >4 1.7 0.4 0.9 Nitration Abs/cm *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 25.0 18.6 20. FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.7	Sodium	ppm	ASTM D5185m		5	<1	2
Soot % % *ASTM D7844 >4 1.7 0.4 0.9 Nitration Abs/cm *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 25.0 18.6 20. FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.	Potassium	ppm	ASTM D5185m	>20	1	<1	4
Nitration Abs/cm *ASTM D7624 >20 12.1 6.7 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 25.0 18.6 20. FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.	INFRA-RED		method	limit/base	current	history1	history
Sulfation Abs/.1mm *ASTM D7415 >30 25.0 18.6 20. FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.	Soot %	%	*ASTM D7844	>4	1.7	0.4	0.9
FLUID DEGRADATION method limit/base current history1 h Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.	Nitration	Abs/cm	*ASTM D7624	>20	12.1	6.7	8.6
Oxidation Abs/.1mm *ASTM D7414 >25 20.1 14.2 16.	Sulfation	Abs/.1mm	*ASTM D7415	>30	25.0	18.6	20.4
	FLUID DEGRAI	DATION	method	limit/base	current	history1	history
Base Number (BN) mg KOH/g ASTM D2896 9.8 5.1 8.2 7.2	Oxidation	Abs/.1mm	*ASTM D7414	>25	20.1	14.2	16.3
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	5.1	8.2	7.2

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.

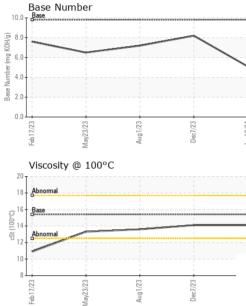
Fluid Condition

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



d	Laboratory Sample No. Lab Number	: WearCheck USA - : GFL0107689 : 06076596	501 Madison Av Recieved Diagnosed	ve., Cary, NC 275 : 01 Feb 2024 : 01 Feb 2024	513 GFL Er	nvironmental	- 465 - Pontiac 888 Baldwin Pontiac, MI
		Hahrman Alar 17/12/12/12/12/12/12/12/12/12/12/12/12/12/	Aug1/23		4.0 2.0 0.0 E2/E2/E2/eW	Aug 1/23	Dec7/23 +
		17- 16- 015- 014- 313 Abnormal		Base Number (mp KOH/g)	8.0 2 6.0		
		Viscosity @ 100°	C		Base Number		
		Feb17/23 0 May23/23	Aug1/23	Jan 16/24			
			<				
		100 - copper 80 - copper 80 - copper 100 - c					
		Non-ferrous Meta		, Lan			
		20 10 0 EZZL1 (rej-	Aug1/23	Jan 16/24			
		50 E 40 30		/			
Aug1/23	Dec7/23	ron 70 60					
		GRAPHS Ferrous Alloys					
		FLUID PROPE Visc @ 100°C		thod limit/bas	se current	history1 14.1	history2 13.6
		Emulsified Water Free Water	scalar *Visu scalar *Visu		NEG NEG	NEG NEG	NEG NEG
Aug1/23	Dec7/23 Jan16/24	Appearance Odor	scalar *Visu	al NORML	NORML NORML	NORML	NORML
	23	Sand/Dirt	scalar *Visu	ual NONE	NONE NONE	NONE	NONE
		Silt	scalar *Visu	ial NONE	NONE	NONE	NONE
		Yellow Metal Precipitate	scalar *Visu		NONE	NONE NONE	NONE NONE

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

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