

## **OIL ANALYSIS REPORT**

Sample Rating Trend

### NORMAL



#### Component Diesel Engine

Fluid

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

#### 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.

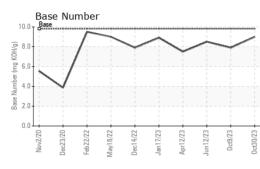
#### Fluid Condition

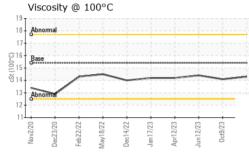
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0098670	GFL0093720	GFL0078550
Sample Date		Client Info		30 Oct 2023	09 Oct 2023	12 Jun 2023
Machine Age	hrs	Client Info		7451	7324	6492
Oil Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
	0		11 1. 0			
WEAR METAL		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	2	6	5
Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Nickel	ppm	ASTM D5185m	>4	0	0	0
Titanium	ppm	ASTM D5185m		0	<1	<1
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	2	2	<1
Lead	ppm	ASTM D5185m	>40	0	0	0
Copper	ppm	ASTM D5185m	>330	0	1	<1
Tin	ppm		>15	0	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 5	history1 10	history2 0
	ppm ppm					
Boron		ASTM D5185m	0	5	10	0
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0 0 60	5 0	10 12	0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	5 0 57	10 12 64	0 0 63
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	5 0 57 0	10 12 64 <1	0 0 63 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	5 0 57 0 960	10 12 64 <1 955	0 0 63 <1 1029
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	5 0 57 0 960 1051	10 12 64 <1 955 1039	0 0 63 <1 1029 1200 1049 1310
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	5 0 57 0 960 1051 1098	10 12 64 <1 955 1039 975	0 0 63 <1 1029 1200 1049
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270	5 0 57 0 960 1051 1098 1280	10 12 64 <1 955 1039 975 1216	0 0 63 <1 1029 1200 1049 1310
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	5 0 57 0 960 1051 1098 1280 3185	10 12 64 <1 955 1039 975 1216 2887	0 0 63 <1 1029 1200 1049 1310 3631
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	5 0 57 0 960 1051 1098 1280 3185 current	10 12 64 <1 955 1039 975 1216 2887 history1	0 0 63 <1 1029 1200 1049 1310 3631 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	0 0 60 1010 1070 1150 1270 2060 imit/base >25	5 0 57 0 960 1051 1098 1280 3185 current 4	10 12 64 <1 955 1039 975 1216 2887 history1 3	0 0 63 <1 1029 1200 1049 1310 3631 history2 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 imit/base >25	5 0 57 0 960 1051 1098 1280 3185 <u>current</u> 4 5	10 12 64 <1 955 1039 975 1216 2887 history1 3 22	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 2 21
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>imit/base</b> >25	5 0 57 0 960 1051 1098 1280 3185 <u>current</u> 4 5 <1	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 2 21 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	5 0 57 0 960 1051 1098 1280 3185 <b>current</b> 4 5 <1 <1 <b>current</b> 0.2	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6 history1	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 21 1 1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	5 0 57 0 960 1051 1098 1280 3185 current 4 5 <1 current	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6 history1 0.5	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 21 1 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>imit/base</b> >25 >20 <b>imit/base</b> >3 >20	5 0 57 0 960 1051 1098 1280 3185 <i>current</i> 4 5 <1 <i>current</i> 0.2 5.1	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6 history1 0.5 6.8	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 2 21 1 history2 0.4 7.3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 2260 225 220 220 imit/base >3 >20 >30 imit/base	5 0 57 0 960 1051 1098 1280 3185 <i>current</i> 4 5 <1 <i>current</i> 0.2 5.1 18.1	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6 history1 0.5 6.8 18.9 history1	0 0 63 <1 1029 1200 1049 1310 3631 history2 2 21 1 1 history2 0.4 7.3 19.2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 imit/base >25 20 imit/base >3 >20 imit/base >3 >20	5 0 57 0 960 1051 1098 1280 3185 <b>current</b> 4 5 <1 <b>current</b> 0.2 5.1 18.1	10 12 64 <1 955 1039 975 1216 2887 history1 3 22 6 history1 0.5 6.8 18.9	0 0 63 <1 1029 1200 1049 1310 3631 <b>history2</b> 2 21 1 <b>history2</b> 0.4 7.3 19.2



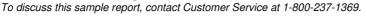
# **OIL ANALYSIS REPORT**





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	14.3	14.1	14.4
GRAPHS						

Ferrous Alloys 70 60 icke 50 40 30 20 10 n Jan 17/23 Apr12/23 )ec23/20 Feb22/22 May18/22 Dec14/22 un12/23 049/23 Vov2/20 Non-ferrous Metals 10 lead ppm 2 Jec23/20 /av18/22 Jec14/22 an17/7: C/6+-1 let30/73 nr12/2 CICCHe: Viscosity @ 100°C Base Number 19 10.0 18 17 8. (mg KOH/g) (100°C) (100°C 6 ( Ba umber 4 ( Base 13 Ab 2 ( 12 11-0.0 0ct30/23 . Nov2/20 Apr12/23 Jun12/23 0ct9/23 Jan 17/23 Apr12/23 Jun12/23 0ct9/23 Oct30/23 Dec23/20 Dec23/20 Dec14/22 Jan 17/23 Nov2/20 Feb22/22 Mav18/22 Dec14/22 Feb22/22 Mav18/22 GFL Environmental - 837 - Harrison TS Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : GFL0098670 Received : 06 Nov 2023 22820 S State Route 291 Lab Number : 05999723 : 07 Nov 2023 Harrisonville, MO Diagnosed Unique Number : 10728083 Diagnostician : Wes Davis US 64701 Test Package : FLEET Contact: BRYAN SWANSON bryanswanson@gflenv.com



\* - 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

Т:

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