

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend





#### Component Diesel Engine

Fluid PETRO CANADA DURON SHP 15W40 (36 QTS)

### 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

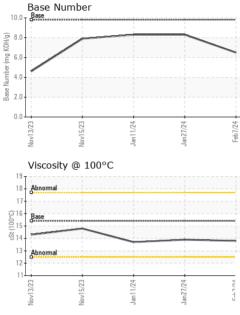
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0110099	GFL0110048	GFL0110015
Sample Date		Client Info		07 Feb 2024	27 Jan 2024	11 Jan 2024
Machine Age	hrs	Client Info		17657	17563	17421
Oil Age	hrs	Client Info		600	600	600
Oil Changed		Client Info		Changed	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
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	11	15	17
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	1	0	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>3	<1	0	0
Aluminum	ppm	ASTM D5185m	>20	<1	6	7
Lead	ppm	ASTM D5185m	>40	0	<1	0
Copper	ppm	ASTM D5185m	>330	5	2	0
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 0	current 1	history1 <1	history2 2
	ppm ppm	ASTM D5185m				
Boron		ASTM D5185m	0	1	<1	2
Boron Barium	ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	1 0	<1 0	2 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	1 0 56 <1 898	<1 0 49	2 0 55
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	1 0 56 <1	<1 0 49 <1	2 0 55 <1
Boron Barium Molybdenum Manganese Magnesium	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	1 0 56 <1 898	<1 0 49 <1 840 904 933	2 0 55 <1 882 960 1050
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 ASTM D5185m	0 0 60 0 1010 1070	1 0 56 <1 898 991	<1 0 49 <1 840 904	2 0 55 <1 882 960 1050 1222
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	0 0 60 0 1010 1070 1150	1 0 56 <1 898 991 1014	<1 0 49 <1 840 904 933	2 0 55 <1 882 960 1050
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	1 0 56 <1 898 991 1014 1199	<1 0 49 <1 840 904 933 1118	2 0 55 <1 882 960 1050 1222
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	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 0 1010 1070 1150 1270 2060	1 0 56 <1 898 991 1014 1199 2717	<1 0 49 <1 840 904 933 1118 2582	2 0 55 <1 882 960 1050 1222 2977
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 ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	1 0 56 <1 898 991 1014 1199 2717 current	<1 0 49 <1 840 904 933 1118 2582 history1	2 0 55 <1 882 960 1050 1222 2977 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	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	1 0 56 <1 898 991 1014 1199 2717 current 3	<1 0 49 <1 840 904 933 1118 2582 history1 6	2 0 55 <1 882 960 1050 1222 2977 history2 6
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 ASTM D5185m <b>method</b> ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 Limit/base >25	1 0 56 <1 898 991 1014 1199 2717 current 3 2	<1 0 49 <1 840 904 933 1118 2582 history1 6 10	2 0 55 <1 882 960 1050 1222 2977 history2 6 2
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 60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25 >20	1 0 56 <1 898 991 1014 1199 2717 current 3 2 0	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 225 >25	1 0 56 <1 898 991 1014 1199 2717 current 3 2 2 0 0	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3 <i>history1</i>	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2 2 2 <i>h</i> istory2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >3	1 0 56 <1 898 991 1014 1199 2717 current 3 2 0 0 current 0.5	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3 history1 0.6	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2 2 2 2 history2 0.7
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 <i>limit/base</i> >25 >20 <i>limit/base</i> >3 >20	1 0 56 <1 898 991 1014 1199 2717 current 3 2 0 current 0.5 8.7	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3 history1 0.6 8.2	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2 2 2 2 5 4 2 2 2 1 5 5 6 2 2 2 1 5 7 8.6
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 2060 225 20 225 20 20 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20	1 0 56 <1 898 991 1014 1199 2717 current 3 2 0 current 0.5 8.7 20.1	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3 <b>history1</b> 0.6 8.2 19.4	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2 2 2 bistory2 0.7 8.6 20.0
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	ASTM D5185m ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 2060 225 220 220 220 220 20 20 20 20 20 20 20 20	1 0 56 <1 898 991 1014 1199 2717 <i>current</i> 3 2 2 0 <i>current</i> 0.5 8.7 20.1 <i>current</i>	<1 0 49 <1 840 904 933 1118 2582 history1 6 10 3 history1 0.6 8.2 19.4 history1	2 0 55 <1 882 960 1050 1222 2977 history2 6 2 2 2 history2 0.7 8.6 20.0 history2



# **OIL ANALYSIS REPORT**

VISUAL



		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
Jan 1 1/24	Jan 27/24 Feb 7/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Jan	Jan	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
С		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
1		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPE	RTIES	method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	15.4	13.8	13.9	13.7
		GRAPHS						
		Ferrous Alloys						
- 1/24 -	1/24	80 - iron chromium						
Jan 1 1/24	Jan27/24	70 - nickel						
		<sup>60</sup> 50						
		E 40						
		30						
		20						
		Vov13/23	Jan 11/24	Jan 27/24 .	Feb7/24			
		Novi	Janj	Janí	Lar 191			
		Non-ferrous Meta	ls					
		10 copper		1				
		8 - sessesses lead						
		c						
		6- E						
		6 6 4						
		udd 4			/			
		4			/			
			24	24	24			
			an11/24	an21/24	Feb7/24			
		CZ/ST/VOM	Jan 11/24	Jan27/24	Feb.7/24			
				Jan 27/24		Base Number		
		Viscosity @ 100°C		Jan27/24		Base Number		
		Viscosity @ 100°C		Jan 27/24	11	Base Number		
		Viscosity @ 100°C		Jan27/24	11	0.0 Base		
		Viscosity @ 100°C		Jan27/24	11	8.0 6.0		
		Viscosity @ 100°C			11	8.0		
		Viscosity @ 100°C		Jan27124	ase Number (mg KOH/g)	8.0 6.0		
		Viscosity @ 100°C		Jan271/24	Base Number (mg KOH(a)	8.0		
		Viscosity @ 100°C			Base Number (mg KOH/g)	8.0	124	124
		Viscosity @ 100°C		Jan27/24 - Jan27/24 - Jan22/24 -	Base Number (mg KOH(a)	8.0	Jan 11/24	Jan27/24
		Viscosity @ 100°C	Jan11/24	Jan27/24	Feb 7/24 Base Number (mg KOH(g)	0.0 Base 0.0 Base 0.0 Control Contro		
	Laboratory Sample No.	Viscosity @ 100°C	e +z/lluer 01 Madisc	h72/22/uer	+epJ/54 +FepJ/54 +FepJ/54 +FepJ/57 +Fep	0.0 Base 0.0 Base 0.0 Control Contro	ironmental - 410	) - Michigan West
	Laboratory Sample No. Lab Number	Viscosity @ 100°C Viscosity @ 100°C Abnomal Abnomal CEELINA ESENTIAL E	Jan11/24	brin Ave., Cary	Feb 7/24 Base Number (mg KOH(g)	0.0 Base 0.0 Base 0.0 Control Contro	ironmental - 410	<b>) - Michigan West</b> 00 Van Born Rd Wayne, MI
	Sample No. Lab Number Unique Number	Viscosity @ 100°C Viscosity @ 100°C Viscosity @ 100°C	01 Madisc Rece Teste	brin Ave., Cary ived : 12 ad : 13	(0)H00 rulu) arquirul	0.0 Base 0.0 GFL Envi	ironmental - 410 390	<b>) - Michigan West</b> 00 Van Born Rd Wayne, MI US 48184
Certificate L2367	Sample No. Lab Number Unique Number Test Package	Viscosity @ 100°C Viscosity @ 100°C Viscosity @ 100°C	D1 Madisco Rece Teste Diagr	br Ave., Cary ived : 12 ed : 13 nosed : 13	(0)HOX Bull Jaquini argum +72/293 , NC 27513 Feb 2024 Feb 2024 - 1	0.0 Base 0.0 GFL Envi	ironmental - 410 390 Contac	<b>) - Michigan West</b> 00 Van Born Rd Wayne, MI US 48184 :t: Belal Dgheish
To discuss this	Sample No. Lab Number Unique Number Test Package s sample report,	Viscosity @ 100°C Viscosity @ 100°C Viscosity @ 100°C	01 Madisco Rece Teste Diagr	on Ave., Cary ived : 12 ed : 13 nosed : 13	(0)H03 fbul page +7/2 (P4 +7/2 (P4	0.0 Base 0.0 GFL Envi	i <b>ronmental - 41(</b> 390 Contac bdghe	<b>) - Michigan West</b> 00 Van Born Rd Wayne, MI US 48184

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Submitted By: seel also GFL468 - Laura Wilson