

OIL ANALYSIS REPORT

Sample Rating Trend





Diesel Engine

Fluid PETRO CANADA DURON SHP 15W40 (18 QTS)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

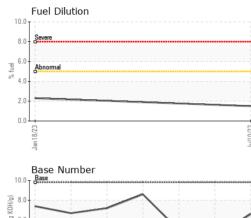
Fluid Condition

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

x 10)		Jul2020	Sep2020 Nov2020	Mar2021 Sep2021 Jan2023	Jul2023	
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0057572	GFL0057583	GFL0034390
Sample Date		Client Info		10 Jul 2023	18 Jan 2023	10 Sep 2021
Machine Age	hrs	Client Info		13077	0	0
Oil Age	hrs	Client Info		13077	12090	202
Oil Changed		Client Info		N/A	N/A	Diff Oil
Sample Status				NORMAL	ATTENTION	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	22	40	73
Chromium	ppm	ASTM D5185m	>20	<1	<1	2
Nickel	ppm	ASTM D5185m	>4	<1	0	<1
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>20	5	8	9
Lead	ppm	ASTM D5185m	>40	0	0	0
Copper	ppm	ASTM D5185m	>330	1	2	4
Tin	ppm	ASTM D5185m	>15	0	0	<1
Antimony	ppm	ASTM D5185m				0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
Deve		ACTM DE10Em	0	12	3	4
Boron	ppm	ASTM D5185m	0	12	0	-
Boron Barium	ppm ppm	ASTM D5185m	0	0	0	0
Barium	ppm	ASTM D5185m ASTM D5185m	0	0	0	0
Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	0 60	0 63	0 60	0 70
Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0	0 63 <1	0 60 <1	0 70 1
Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010	0 63 <1 771	0 60 <1 809	0 70 1 1069
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070	0 63 <1 771 1070	0 60 <1 809 1056	0 70 1 1069 1250
Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150	0 63 <1 771 1070 942	0 60 <1 809 1056 903	0 70 1 1069 1250 1139
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	0 60 0 1010 1070 1150 1270	0 63 <1 771 1070 942 1108	0 60 <1 809 1056 903 1120	0 70 1 1069 1250 1139 1315
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 60 0 1010 1070 1150 1270 2060	0 63 <1 771 1070 942 1108 2665	0 60 <1 809 1056 903 1120 2732	0 70 1 1069 1250 1139 1315 2384
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	0 60 0 1010 1070 1150 1270 2060	0 63 <1 771 1070 942 1108 2665 current	0 60 <1 809 1056 903 1120 2732 history1	0 70 1 1069 1250 1139 1315 2384 history2
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	0 60 0 1010 1070 1150 1270 2060	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5	0 60 <1 809 1056 903 1120 2732 history1 7	0 70 1 1069 1250 1139 1315 2384 history2 8
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	0 60 0 1010 1070 1150 1270 2060 Limit/base >25 >20	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <	0 60 <1 809 1056 903 1120 2732 history1 7 <1	0 70 1 1069 1250 1139 1315 2384 history2 8 1
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 Limit/base >25 >20	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2	0 70 1 1069 1250 1139 1315 2384 history2 8 1 9
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >20	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4 1.5	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2.3	0 70 1 1069 1250 1139 1315 2384 <u>history2</u> 8 1 9 <1.0
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 2060 225 >20 >20 >20 >20 >5 S	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4 1.5 <u>current</u>	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2 2 2 3 2 2 3 2 3	0 70 1 1069 1250 1139 1315 2384 history2 8 1 9 <1.0 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m	0 60 0 1010 1070 1150 1270 2060 2060 225 >20 >20 >20 >20 >5 S	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4 1.5 <u>current</u> 0.2	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2.3 history1 0.6	0 70 1 1069 1250 1139 1315 2384 history2 8 1 9 <1.0 history2 0.9
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 60 1010 1070 1150 1270 2060 limit/base >25 >20 >5 limit/base >3 >20	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4 1.5 <u>current</u> 0.2 9.3	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2 1 2 1 0.6 12.8	0 70 1 1069 1250 1139 1315 2384 <u>history2</u> 8 1 9 <1.0 <u>history2</u> 0.9 14.8
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 60 1010 1070 1150 1270 2060 2060 225 20 >20 >20 >20 >3 >20 >3 >20	0 63 <1 771 1070 942 1108 2665 <u>current</u> 5 <1 4 1.5 <u>current</u> 0.2 9.3 19.0	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2.3 history1 0.6 12.8 24.0	0 70 1 1069 1250 1139 1315 2384 history2 8 1 9 <1.0 history2 0.9 14.8 28.6
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 ASTM D3524 ASTM D78444 *ASTM D7624 *ASTM D7624	0 60 1010 1070 1150 1270 2060 2060 >25 >20 >20 >5 >20 >3 >20 >30 >30	0 63 <1 771 1070 942 1108 2665 current 5 <1 4 1.5 current 0.2 9.3 19.0 current	0 60 <1 809 1056 903 1120 2732 history1 7 <1 2 2 2.3 history1 0.6 12.8 24.0 history1	0 70 1 1069 1250 1139 1315 2384 history2 8 1 9 <1.0 history2 0.9 14.8 28.6 history2



OIL ANALYSIS REPORT



Base	e Numbe	er				En
10.0 Base	000066666	-				Fre
(B) 8.0						F
B 8.0 6.0 4.0 2.0						Vis
aquina 4.0					~	C
B 2.0-						F
0.0	-	-	51	51		- ⁸⁰
Jul10/20	Sep20/20	Nov13/20	Mar26/21	Sep10/21	Jan 18/23	60-
			-			50 -
Visc 20 T	osity @	100°C				튭 40 -
18 - Abnor	mal					30-
			1	1		20 - 10 -
(100				~		J
Abnor	mal		\checkmark			10/20
12-					-	
10		+				_ N
Jul10/20	Sep20/20	Nov13/20	Mar26/21	Sep 10/21	Jan 18/23	

	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
Jul10/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Jul	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	12.4	1 1.9	14.6
	GRAPHS						
	Ferrous Alloys						
23	iron		A				
Jan 18/23	60 - nickel	/	\sim				
7	50-		$\langle \rangle$				
	툍 40						
	30						
	20 -						
	10						
		27	3 5				
	Jul10/20 Sep20/20 Nov13/20	Mar26/21	Sep 10/21 Jan 18/23	Jul10/23			
			Ja Si	5			
23	Non-ferrous Meta	IS					
Jan 18/23	copper						
7	8 - Research lead						
	6						
	udd						
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	and the state of the	_					
	And a state of the	21	21	53			
			2 2	2			
		lar26	an16	ul10			
	Jul10/20 Sep20/20 Nov13/20	Mar26/21	Sep 10/21 Jan 18/23	Jul10/23			
			Sep1		Base Numbe	2r	
	02/01/07/02/des Viscosity @ 100°C		Sep 1		Base Numbe	9 r	
	02/01/07 Viscosity @ 100°C		Sep1	10.0	- Base		
	02/01/07/02/05/02/02/02/02/02/02/02/02/02/02/02/02/02/		Sep1	10.0	Base		
	02/01/07/02/05/02/02/02/02/02/02/02/02/02/02/02/02/02/		Sep1	10.0	Base	21	
	02/02/02/02/02/02/02/02/02/02/02/02/02/0		Sep1	10.0	Base		
	027011m Viscosity @ 100°C Viscosity @ 100°C Abnomal		Sep1	10.0 (D)HOX (D)HOX (D)HOX (D) (D)HOX (D) (D)HOX (D) (D)HOX (D) (D)HOX (D) (D)HOX (D) (D)HOX (D) (D)HOX (D)HOX (D) (D)HOX (D)HOX (D)HOX (D) (D)HOX (D)HOX (D)HOX (D)HOX (D)HOX (D) (D)HOX (D)HOX	Base	21	
	02/02/02/02/02/02/02/02/02/02/02/02/02/0		Sep1	0.0 8.0 (0HQ) 0.0 0 Bull 100 0 Bull	Base	91	
	02001100 Viscosity @ 100°C			10.0 (0)HOX but back but back back back back back back back back	Base		
	02001100 Viscosity @ 100°C			10.0 (0)HOX but back but back back back back back back back back	Base		18/23
	027011m Viscosity @ 100°C Viscosity @ 100°C Abnomal 17 6 8ase 4bnomal 12 14 4bnomal		Sep1021 Sep1 Jan18/23 Jan18	10.0 (0)HOX Bull Bull Jaquiny Seg 2.0	Asse	5L Mov13/20	Jan 18/23
	02/01/10 02/02/des 02/02/02/des 02/02/02/02/des 02/02/02/des 02/02/02/02/02/02/02/02/02/02/02/02/02/0	Maz621	Sep 10/21 Jan 18/23	10.0 (0)HOX Bull 34 Bull 34 Bu	Pase Pase Sap 20/2/0	Nov13/20	
oratory	Viscosity @ 100°C	Maz621	EZBILLER Son Ave., Ca	10.0 (0)HOX Bull 34 Bull 34 Bu	Pase Pase Sap 20/2/0	- LZ1213220 - LZ1232220 Environmental -	009 - Fairbu
	Viscosity @ 100°C Viscosity @ 100°C Abnomal Abnomal Control Co	501 Madis	EZIGILIEF son Ave., Ca	10.0 (0)HOX but 30 (0)HOX but	Pase Pase Sap 20/2/0	- LZ1213220 - LZ1232220 Environmental -	009 - Fairbu Roosevelt Hv
oratory nple No. Number jue Number	Viscosity @ 100°C Viscosity @ 100°C Abnormal Abnormal Control of the second Control of t	501 Madia Received Diagnost	12001445 son Ave., Ca d : 17, ed : 18, tician : We	10.0 (0)(0) (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(Pase Pase Sap 20/2/0	07/21/10/10/21/21/21/21/21/21/21/21/21/21/21/21/21/	009 - Fairbu Roosevelt Hv Fairburn, G US 302 ⁻
oratory nple No. Number jue Number t Package	Viscosity @ 100°C Viscosity @ 100°C base base base control base base control base base control base control base control base control base control base control contro	501 Madis Received Diagnost Tests: Fu	son Ave., Ca d : 17, ed : 18, tician : We	10.0 (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(Pase Pase Sap 20/2/0	DZEIMON Environmental - 6905 Con	009 - Fairbu Roosevelt Hv Fairburn, G

To discuss this sample r * - 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

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