

## **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id **4709M** 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.

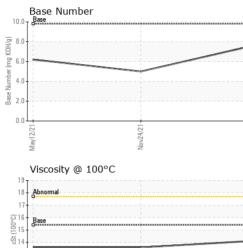
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0086641	GFL0036205	GFL0018098
Sample Date		Client Info		18 Jul 2023	24 Nov 2021	12 May 2021
Machine Age	hrs	Client Info		11014	6283	4496
Oil Age	hrs	Client Info		6283	4496	3318
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	ABNORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
						46
Iron	ppm	ASTM D5185m	>75	26	▲ 84 3	46 2
Chromium	ppm	ASTM D5185m	>5	1		
Nickel Titanium	ppm	ASTM D5185m	>4	0	<1	<1 <1
Silver	ppm	ASTM D5185m	>2 >2	0 <1	<1 <1	<1
Aluminum	ppm ppm	ASTM D5185m ASTM D5185m	>2	5	<1	<1
Lead	ppm	ASTM D5185m	>25	5 1	0	o <1
Copper	ppm	ASTM D5185m		، <1	8	7
Tin	ppm	ASTM D5185m	>4	<1	0	<1
Antimony	ppm	ASTM D5185m	>4		3	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
oddinidini	ppm	7101111 20100111		•	0	Ū
		mothod	limit/booo	ourropt	history	history
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	0	3	4	3
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	3 0	4 0	3 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	3 0 59	4 0 63	3 0 57
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	3 0 59 <1	4 0 63 1	3 0 57 <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	3 0 59 <1 959	4 0 63 1 1084	3 0 57 <1 882
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	3 0 59 <1 959 1097	4 0 63 1 1084 1227	3 0 57 <1 882 1019
Boron 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 0 60 0 1010 1070 1150	3 0 59 <1 959 1097 1018	4 0 63 1 1084 1227 1052	3 0 57 <1 882 1019 926
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	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	3 0 59 <1 959 1097 1018 1315	4 0 63 1 1084 1227 1052 1273	3 0 57 <1 882 1019 926 1113
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	0 0 60 0 1010 1070 1150	3 0 59 <1 959 1097 1018	4 0 63 1 1084 1227 1052	3 0 57 <1 882 1019 926 1113 2156
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	3 0 59 <1 959 1097 1018 1315	4 0 63 1 1084 1227 1052 1273	3 0 57 <1 882 1019 926 1113
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	3 0 59 <1 959 1097 1018 1315 3418	4 0 63 1 1084 1227 1052 1273 2460	3 0 57 <1 882 1019 926 1113 2156
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	3 0 59 <1 959 1097 1018 1315 3418 current	4 0 63 1 1084 1227 1052 1273 2460 history1	3 0 57 <1 882 1019 926 1113 2156 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 limit/base >25	3 0 59 <1 959 1097 1018 1315 3418 current 4	4 0 63 1 1084 1227 1052 1273 2460 history1 10	3 0 57 <1 882 1019 926 1113 2156 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 1010 1070 1150 1270 2060 limit/base >25	3 0 59 <1 959 1097 1018 1315 3418 <u>current</u> 4 4	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11	3 0 57 <1 882 1019 926 1113 2156 history2 6 9
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	3 0 59 <1 959 1097 1018 1315 3418 current 4 4 4	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 10 11 \$53	3 0 57 <1 882 1019 926 1113 2156 history2 6 9 22
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 limit/base >25 >20 limit/base	3 0 59 <1 959 1097 1018 1315 3418 current 4 4 4 4	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 10 11 53 bistory1	3 0 57 <1 882 1019 926 1113 2156 history2 6 9 22 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 TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base	3 0 59 <1 959 1097 1018 1315 3418 current 4 4 4 4 2 0.4	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 53 53 history1 1.2	3 0 57 <1 882 1019 926 1113 2156 history2 6 9 22 <u>history2</u> 1
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 imit/base >25 imit/base >20	3 0 59 <1 959 1097 1018 1315 3418 <i>current</i> 4 4 4 4 <i>current</i> 0.4 10.8	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 10 11 53 history1 1.2 1.2 14.6	3 0 57 <1 882 1019 926 1113 2156 history2 6 9 22 history2 1 1 12.7
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 <b>imit/base</b> >25 <b>imit/base</b> >20 <b>imit/base</b> >20	3 0 59 <1 959 1097 1018 1315 3418 <u>current</u> 4 4 4 4 4 4 <u>current</u> 0.4 10.8 22.9	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 10 11 53 bistory1 1.2 1.2 14.6 27.5	3 0 57 <1 882 1019 926 1113 2156 <b>history2</b> 6 9 22 <b>history2</b> 1 1 12.7 26.1
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 D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 imit/base >25 imit/base >6 >20 >30 imit/base	3 0 59 <1 959 1097 1018 1315 3418 <i>current</i> 4 4 4 4 4 0.4 10.8 22.9 <i>current</i>	4 0 63 1 1084 1227 1052 1273 2460 history1 10 11 ↓ 53 history1 1.2 14.6 27.5 history1	3 0 57 <1 882 1019 926 1113 2156 history2 6 9 22 history2 1 1 12.7 26.1 history2



Base

13 Abnormal 12 11 May12/21.

# **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	
4/21	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
Nov24/21	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
νĊ	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG	
	Free Water	scalar	*Visual		NEG	NEG	NEG	
	FLUID PROPI	ERTIES	method	limit/base	current	history1	history2	
	Visc @ 100°C	cSt	ASTM D445	15.4	14.1	13.6	13.6	
	GRAPHS							
	Ferrous Alloys							
	<sup>90</sup> T	~						
Nov24/21	80 - Iron 70 - Iron Iron	$\sim$						
Nov	60							
	щ <sup>50</sup> d 40							
	1							
	30 - 20 - 20 - 20 - 20 - 20 - 20 - 20 -							
	10-							
	0			FEERING				
	/12/21	Vov24/21		Jul18/23				
	May1	Nov		Jul				
	Non-ferrous Meta	als						
	10 copper							
	8 - management lead							
	Edd							
	4							
	2							
	C		The substant of	7				
		Number of Street Street	A CONTRACTOR OF STREET, STREET					
	ay12/21	Nov24/21		Jul18/23				
	2			5				
	Viscosity @ 100°	L			Base Number			
	18 - Abnormal			10.				
	17-				o -			
	G-16 Page			.8 .6 .9 .9 .9 .9 .9 .9 .9 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0				
	016 Base 15 53 14			E b.	0			
	<sup>ଟ</sup> ୍ତ <sub>14</sub> .				0-			
	13 Abnormal			Base	0			
	12 -			<u> </u>				
	11			0.				
	May12/2	Nov24/21		Jul18/23	May12/21	Nov24/21	Jul18/23	
	≥	Ň		7	Z	Ň	JL.	
Laboratory					3 GFL Env	vironmental - 415	- Michigan East	
Sample No		Receive		Jul 2023	0			
Lab Number Unique Num		Diagnos Diagnos		Jul 2023 s Davis		Steri	ing Heights, MI US 48313	
Certificate L2367 Test Packa		Biagnos		0 0 4 10		Contac	ct: Frank Wolak	
To discuss this sample repo	ort, contact Customer Ser					fwola	ak@gflenv.com	
* - Denotes test methods th							(586)825-9514	
Statements of conformity to s	pecifications are based on	the simple	e acceptance o	decision rule (	(JCGM 106:2012,	)	F:	

Submitted By: Frank Wolak