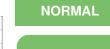


## **OIL ANALYSIS REPORT**

Sample Rating Trend





Machine Id 813102

Fluid

Component Diesel Engine

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

### DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

### Wear

Metal levels are typical for a new component breaking in.

#### Contamination

There is no indication of any contamination in the oil.

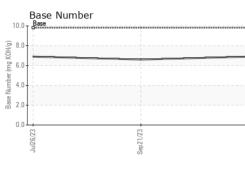
#### Fluid Condition

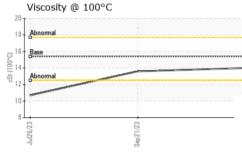
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI		method	limit/base	current	history1	history2
			iiiiiii base			
Sample Number		Client Info		GFL0086733	GFL0071294	GFL0071278
Sample Date	lava	Client Info		07 Dec 2023 1785	21 Sep 2023	26 Jul 2023
Machine Age	hrs	Client Info			1222 1222	765 765
Oil Age	hrs	Client Info		563 Changed		
Oil Changed		Client Info		Changed	Changed	Not Changd
Sample Status				NORMAL	NORMAL	ATTENTION
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	0.4
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	>120	18	21	36
Chromium	ppm	ASTM D5185m	>20	1	<1	1
Nickel	ppm	ASTM D5185m	>5	4	2	5
Titanium	ppm	ASTM D5185m	>2	<1	0	<1
Silver	ppm	ASTM D5185m	>2	<1	<1	<1
Aluminum	ppm	ASTM D5185m	>20	2	0	6
Lead	ppm	ASTM D5185m	>40	<1	<1	0
Copper	ppm	ASTM D5185m	>330	4	15	58
Tin	ppm	ASTM D5185m	>15	1	1	3
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current	history1 7	history2 161
	ppm ppm	ASTM D5185m				
Boron		ASTM D5185m	0	1	7	161
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	1 8	7 <1	161 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	1 8 63	7 <1 65	161 0 116
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	1 8 63 <1	7 <1 65 1	161 0 116 4
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	1 8 63 <1 986	7 <1 65 1 893	161 0 116 4 735
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	1 8 63 <1 986 1117	7 <1 65 1 893 1070	161 0 116 4 735 1458
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	1 8 63 <1 986 1117 978	7 <1 65 1 893 1070 959	161 0 116 4 735 1458 763
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 8 63 <1 986 1117 978 1240	7 <1 65 1 893 1070 959 1183	161 0 116 4 735 1458 763 952
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 1010 1070 1150 1270 2060	1 8 63 <1 986 1117 978 1240 3081	7 <1 65 1 893 1070 959 1183 2764	161 0 116 4 735 1458 763 952 2757
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	1 8 63 <1 986 1117 978 1240 3081 current	7 <1 65 1 893 1070 959 1183 2764 history1	161 0 116 4 735 1458 763 952 2757 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 ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 <b>limit/base</b>	1 8 63 <1 986 1117 978 1240 3081 current 5	7 <1 65 1 893 1070 959 1183 2764 history1 8	161 0 116 4 735 1458 763 952 2757 history2 ▲ 57
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 ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 <b>limit/base</b>	1 8 63 <1 986 1117 978 1240 3081 <u>current</u> 5 0	7 <1 65 1 893 1070 959 1183 2764 history1 8 2	161 0 116 4 735 1458 763 952 2757 2757 history2 \$57 4
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>limit/base</b> >25 >20	1 8 63 <1 986 1117 978 1240 3081 current 5 0 2	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2 2	161 0 116 4 735 1458 763 952 2757 history2 \$57 4 9 9
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	1 8 63 <1 986 1117 978 1240 3081 current 5 0 2 current	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2	161 0 116 4 735 1458 763 952 2757 history2 \$ 57 4 9 9 9
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 ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base	1 8 63 <1 986 1117 978 1240 3081 current 5 0 2 current 0.6	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2 history1 0.6	161 0 116 4 735 1458 763 952 2757 history2 57 4 57 4 9 9 history2 0.6
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> >4 >20	1 8 63 <1 986 1117 978 1240 3081 current 5 0 2 current 0.6 9.5	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2 2 history1 0.6 9.4	161 0 116 4 735 1458 763 952 2757 history2 ▲ 57 4 9 9 history2 0.6 11.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAC	ppm ppm ppm ppm ppm ppm ppm ppm TS 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 >20 >20 >30 imit/base	1 8 63 <1 986 1117 978 1240 3081 Current 5 0 2 Current 0.6 9.5 20.8 Current	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2 history1 0.6 9.4 20.9 history1	<ul> <li>161</li> <li>0</li> <li>116</li> <li>4</li> <li>735</li> <li>1458</li> <li>763</li> <li>952</li> <li>2757</li> <li>history2</li> <li>57</li> <li>4</li> <li>9</li> <li>history2</li> <li>0.6</li> <li>11.0</li> <li>24.4</li> <li>history2</li> </ul>
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	1 8 63 <1 986 1117 978 1240 3081 <u>current</u> 5 0 2 <u>current</u> 0.6 9.5 20.8	7 <1 65 1 893 1070 959 1183 2764 history1 8 2 2 history1 0.6 9.4 20.9	<ul> <li>161</li> <li>0</li> <li>116</li> <li>4</li> <li>735</li> <li>1458</li> <li>763</li> <li>952</li> <li>2757</li> <li>history2</li> <li>57</li> <li>4</li> <li>9</li> <li>history2</li> <li>0.6</li> <li>11.0</li> <li>24.4</li> </ul>



# **OIL ANALYSIS REPORT**





	VISUAL		method				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
Sep 21/23 Dec7/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Sept	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	ERTIES	method	limit/base	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445	15.4	14.0	13.6	▲ 10.69
	GRAPHS						
	Ferrous Alloys						
/23	35 - iron						
Sep 21/23	30- nickel						
	25						
	틆 20 -						
	15						
	10-						
	5						
	2	23	***********************	23			
	Jul26/23	Sep21/23		Dec7/23			
	-			_			
	Non-ferrous Meta	115					
	copper						
	50 - management lead						
	50 tead tin 40						
	management tin						
	40 Eg 30						
	40 <u>5</u> 30 20						
	40 Eg 30						
	40 40 50 20 10 0	53		33			
	40 40 50 20 10 0	p21/23		Jec7/23			
	40 E 30 20 10	C C		Dec7/23	Daga Numbar		
	40 40 10 10 10 10 10 10 10 10 10 1	\$		Dec1/23	Base Number		
	Viscosity @ 100°	\$		10	0.0 Base		
	40 40 20 20 10 0 CV 20 10 CV 20 10 CV 20 CV CV 20 CV 20 CV 20 CV 20 CV 20 CV CV CV CV CV CV CV CV CV CV	\$		10			
	40 40 20 20 10 0 CV 20 10 CV 20 10 CV 20 CV CV 20 CV 20 CV 20 CV 20 CV 20 CV CV CV CV CV CV CV CV CV CV	\$		10	0.0 Base		
	40 40 20 20 10 0 EX 92 92 10 0 EX 92 92 10 0 EX 92 92 10 0 EX 92 92 10 0 EX 92 92 10 0 EX 92 10 0 EX 92 10 10 10 10 10 10 10 10 10 10	\$		10	0.0 Base 0.0	-	
	40 40 20 20 10 10 10 10 10 10 10 10 10 1	\$		10	8.0 Base		
	40 40 40 40 40 40 40 40 40 40	\$		8 (0) ase Number 4	0.0 Base 0.0		
	40 40 40 40 40 40 40 40 40 40	\$		(0,400 g m) (0,400 g m) Base Munhar Base Sama Base Sama Base Sama Base Sama Base Sama Sama Sama Sama Sama Sama Sama Sama	0.0 Base		
	40 40 20 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 EV 20 10 0 10 0 10 0 10 0 10 10 1	C		8 (k) Base lyumber 2 2	Base		
	40 40 40 40 40 40 40 40 40 40	\$		(0,400 g m) (0,400 g m) Base Munhar Base Sama Base Sama Base Sama Base Sama Base Sama Sama Sama Sama Sama Sama Sama Sama	0.0 Base	Sap 21/23	
Laboratory	40 40 20 20 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 0 EV 82 10 10 10 10 10 10 10 10 10 10	C S Sep21/23		Dec7/23 Base Number (mg KOH(g) 0 Base Number (mg KOH(g)	Base Base Comparison of the second	vironmental - 9	)32 - Muskego H
	Viscosity @ 100° Viscosity @ 100° Base 15 Abnomal 10 9 Exception 15 15 Abnomal 12 10 10 10 10 10 10 10 10 10 10	C	d:08.	(0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	Base Base Comparison of the second	vironmental - 9	
Laboratory Sample No. Lab Number Unique Number	Viscosity @ 100° Viscosity @ 100° Abnormal Control of the second seco	C EZIZZE	d : 08 . ed : 09 .	(0) (0) (0) (0) (0) (0) (0) (0) (0) (0)	Base Base Comparison of the second	vironmental - 9 W144 S	<b>132 - Muskego H</b> 6400 College C Muskego, W US 5315
Laboratory Sample No. Lab Number	Viscosity @ 100° Viscosity @ 100° Abnormal Control of the second seco	501 Madia Recieved Diagnost	d : 08 ( ed : 09 ( tician : We	()(0) (0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(0)(	Base Base Comparison of the second	vironmental - 9 W144 S Contact: 1	<b>)32 - Muskego H</b> 6400 College C Muskego, V

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

Submitted By: BECKY FLETCHER