

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend



# Machine Id 514027

Component Diesel Engine

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

## DIAGNOSIS

#### Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

### Wear

Metal levels are typical for a new component breaking in.

#### Contamination

Elevated aluminum (Al) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. 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.

<i>arte)</i>			Jul2023	0ct2023		
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0084488	GFL0084523	
Sample Date		Client Info		18 Oct 2023	24 Jul 2023	
Machine Age	hrs	Client Info		1209	585	
Oil Age	hrs	Client Info		624	585	
Oil Changed		Client Info		Changed	Changed	
Sample Status				NORMAL	ABNORMAL	
CONTAMINAT	ON	method	limit/base	current	history1	history2
Fuel		WC Method	>2.0	<1.0	0.6	
Glycol		WC Method		NEG	NEG	
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	19	38	
Chromium	ppm	ASTM D5185m	>20	2	3	
Nickel	ppm	ASTM D5185m	>4	<1	<1	
Titanium	ppm	ASTM D5185m		8	<1	
Silver	ppm	ASTM D5185m	>3	<1	<1	
Aluminum	ppm	ASTM D5185m	>20	24	18	
Lead	ppm	ASTM D5185m	>40	1	2	
Copper	ppm	ASTM D5185m	>330	6	38	
Tin	ppm	ASTM D5185m	>15	2	2	
Vanadium	ppm	ASTM D5185m		0	0	
Cadmium	ppm	ASTM D5185m		<1	0	
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 119	history1 61	history2
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185m ASTM D5185m	limit/base 0 0	current 119 0	history1 61 4	history2 
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 0 60	current 119 0 52	history1 61 4 23	history2  
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 0 60 0	current 119 0 52 2	history1 61 4 23 4	history2   
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 0 60 0 1010	current 119 0 52 2 607	history1 61 4 23 4 795	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 60 0 1010 1070	current 119 0 52 2 607 1333	history1 61 4 23 4 795 1385	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 60 0 1010 1070 1150	current 119 0 52 2 607 1333 675	history1 61 4 23 4 795 1385 745	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270	current 119 0 52 2 607 1333 675 867	history1 61 4 23 4 795 1385 745 883 2240	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270 2060	current 119 0 52 2 607 1333 675 867 2601	history1 61 4 23 4 795 1385 745 883 3349	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270 2060	current 119 0 52 2 607 1333 675 867 2601 current	history1 61 4 23 4 795 1385 745 883 3349 history1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	methodASTM D5185mASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270 2060 limit/base >25	current           119           0           52           2           607           1333           675           867           2601           current           13	history1 61 4 23 4 795 1385 745 883 3349 history1 ▲ 47	history2 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	method           ASTM D5185m	limit/base 0 0 0 1010 1070 1150 1270 2060 limit/base >25	current         119         0         52         2         607         1333         675         867         2601         current         13         4	history1 61 4 23 4 795 1385 745 883 3349 history1 ▲ 47 6	history2 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b>	method           ASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73	history1 61 4 23 4 795 1385 745 883 3349 history1 ▲ 47 6 53	history2 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	method           ASTM D5185m	limit/base 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73         current	history1 61 4 23 4 795 1385 745 883 3349 history1 ▲ 47 6 53 history1	history2 history2 history2 history2 history2
ADDITIVES 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	method           ASTM D5185m	limit/base 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >3	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73         current         0.4	history1         61         4         23         4         795         1385         745         883         3349         history1         ▲         47         6         53         history1         0.3	history2 history2 history2 history2 history2 history2
ADDITIVES 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 t spm ppm ppm ppm spm	method           ASTM D5185m	limit/base 0 60 0 1010 1070 1150 1270 2060 limit/base >25 	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73         current         0.4         8.8	<ul> <li>history1</li> <li>61</li> <li>4</li> <li>23</li> <li>4</li> <li>795</li> <li>1385</li> <li>745</li> <li>883</li> <li>3349</li> <li>history1</li> <li>47</li> <li>6</li> <li>53</li> <li>history1</li> <li>0.3</li> <li>9.6</li> </ul>	history2                        history2            history2            history2            history2            history2                  history2            history2
ADDITIVES 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	method           ASTM D5185m           ASTM D5185m	limit/base 0 0 1010 1010 1070 1150 1270 2060 limit/base >25 20 limit/base >3 >20 >30	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73         current         0.4         8.8         20.4	history1         61         23         4         795         1385         745         883         3349         history1         6         53         history1         0.3         9.6         20.4	history2  history2            history2
ADDITIVES 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	method         ASTM D5185m         ASTM D7844         *ASTM D7624         *ASTM D7415         method	limit/base 0 60 0 1010 1070 1150 1270 2060 limit/base >25 	current         119         0         52         2         607         1333         675         867         2601         13         4         73         current         0.4         8.8         20.4	history1         61         23         4         795         1385         745         883         3349         history1         ▲         153         history1         ●         10.3         9.6         20.4	history2                        history2            history2            history2            history2            history2            history2            history2            history2            history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m           ASTM D7180           *ASTM D7844           *ASTM D7624           *ASTM D7414	limit/base   0   60   0   1010   1070   1150   1270   2060   limit/base   >20   limit/base   >30   limit/base   >20	current         119         0         52         2         607         1333         675         867         2601         current         13         4         73         current         0.4         8.8         20.4         current	history1         61         23         4         795         1385         745         883         3349         history1         6         53         history1         0.3         9.6         20.4         history1         16.2	history2   history2                  history2            history2            history2                     history2                           history2



# **OIL ANALYSIS REPORT**

VISUAL





		White Motal	coalar	*\/icual	NONE	NONE	NONE	
		Vollow Motal	scalar	*Vieual	NONE	NONE	NONE	
		Procipitato	scalar	*Visual	NONE	NONE	NONE	
		Citt	Scalar	*Misual	NONE	NONE	NONE	
		Ont	Scalar	visual	NONE	NONE	NONE	
		Depris Canal/Dirt	scalar	visual	NONE	NONE	NONE	
	3	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	
	ct18/2	Appearance	scalar	"Visual	NORML	NORML	NORML	
	0	Odor	scalar	^Visual	NORML	NORML	NORML	
С		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	
		Free Water	scalar	*Visual		NEG	NEG	
		FLUID PROPE	RTIES	method				history2
		Visc @ 100°C	cSt	ASTM D445	15.4	13.4	11.7	
		GRAPHS						
		Ferrous Allovs						
		40						
		35 - iron						
		30 - nickel						
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		15-						
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		Viscosity @ 100°C				Base Number		
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		00 ts 14			uper (			
		13 Abnormal			2 4.0- 2 9	1		
		12			<sup>se</sup> 2.0-			
		11						
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		-			-			0
d	Laboratory	: WearCheck USA - 5	01 Madis	son Ave., Ca	ry, NC 27513	GFL Envir	onmental - 629 -	Northern A1
ANAB	Sample No.	: GFL0084488	Received	:23	Oct 2023		39	47 US 131 N
	Lab Number	: 05986018	Diagnos	ed : 24 (	Oct 2023			Kalkaska, MI
	Unique Number		Diagnost	ician : Sea	In Felton	Contr	US NITCH UCD	49646-8428
Certificate L2367	s sample report	. FLEE I	ice at 1-8	00-237-1369	9.	Conta		SUDERGER
* - Denotes tes	st methods that a	are outside of the ISO 1	7025 sco	pe of accred	itation.		T: (2	31)624-0848

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

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