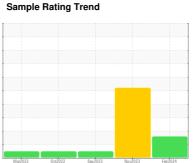


# **OIL ANALYSIS REPORT**



DIRT

Machine Id **522011-847** 

Component **Diesel Engine** 

PETRO CANADA DURON SHP 15W40 (--- 0

## **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

Elemental level of silicon (Si) above normal.

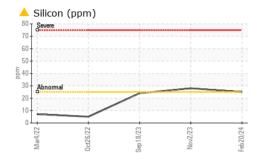
### **Fluid Condition**

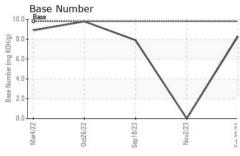
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

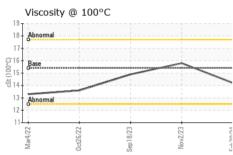
P	AL)		Mar2022	0ct2022	Sep2023 Nov2023	Feb2024	
Sample Date   Client Info   20 Feb 2024   02 Nov 2023   18 Sep 2023   18 Sep 2023   19 T72   19 T72	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         19785         0         19172           Dil Age         hrs         Client Info         670         600         600         600           Dil Age         hrs         Client Info         N/A         Changed         Changed         Changed         Changed         Changed         Changed         Changed         ABNORMAL         ABNORMAL         ABNORMAL         ABNORMAL         ABNORMAL         Normal         ABNORMAL         ABOQ         ABNORMAL         ABNORMAL         ABNORMAL <td>Sample Number</td> <td></td> <td>Client Info</td> <td></td> <td>GFL0051025</td> <td>GFL0018757</td> <td>GFL0051013</td>	Sample Number		Client Info		GFL0051025	GFL0018757	GFL0051013
Dil Age	Sample Date		Client Info		20 Feb 2024	02 Nov 2023	18 Sep 2023
Contained   Client Info   N/A   Changed   Changed   Changed   ABNORMAL   A	Machine Age	hrs	Client Info		19785	0	19172
CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	hrs	Client Info		670	600	600
Fuel	Oil Changed		Client Info		N/A	Changed	Changed
Water	Sample Status				ABNORMAL	ABNORMAL	NORMAL
Water Glycol         WC Method WC Method         >0.2         NEG NEG NEG         NEG NEG NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         7         85         22           Chromium         ppm         ASTM D5185m         >20         0         7         1           Vickel         ppm         ASTM D5185m         >4         0         0         0           Filtrainium         ppm         ASTM D5185m         >4         0         0         0           Giliver         ppm         ASTM D5185m         >4         0         0         0           Aluminum         ppm         ASTM D5185m         >40         0         60         4           Copper         ppm         ASTM D5185m         >40         0         60         4           Copper         ppm         ASTM D5185m         >15         0         8         <1           Vanadium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         90         14	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         7         85         22           Chromium         ppm         ASTM D5185m         >20         0         7         1           Nickel         ppm         ASTM D5185m         >4         0         0         0           Silver         ppm         ASTM D5185m         >3         0         0         0           Aleuninum         ppm         ASTM D5185m         >20         3         6         7           Lead         ppm         ASTM D5185m         >40         0         60         4           Copper         ppm         ASTM D5185m         >40         0         60         4           Copper         ppm         ASTM D5185m         >15         0         8         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Post	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	.S	method	limit/base	current	history1	history2
Silver	ron	ppm	ASTM D5185m	>100	7	85	22
Description	Chromium	ppm	ASTM D5185m	>20	0	7	
Silver	Nickel	ppm	ASTM D5185m	>4	0	0	0
Aluminum	Γitanium	ppm	ASTM D5185m		13	0	9
Lead         ppm         ASTM D5185m         >40         0         60         4           Copper         ppm         ASTM D5185m         >330         0         12         <1           Fin         ppm         ASTM D5185m         >15         0         8         <1           Vanadium         ppm         ASTM D5185m         <1         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Barium         ppm         ASTM D5185m         0         90         14         19           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1         2         <1           Magnesium         ppm         ASTM D5185m         0         <1         2         <1           Potosphorus         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1270         789         1306	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper	Aluminum	ppm	ASTM D5185m	>20	3	6	7
Tin	_ead	ppm	ASTM D5185m	>40	0	<b>6</b> 0	4
Anadium         ppm         ASTM D5185m         <1         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         90         14         19           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         41         49         39           Manganese         ppm         ASTM D5185m         0         <1         2         <1           Magnesium         ppm         ASTM D5185m         1010         713         638         874           Calcium         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current <t< td=""><td>Copper</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;330</td><td>0</td><td>12</td><td>&lt;1</td></t<>	Copper	ppm	ASTM D5185m	>330	0	12	<1
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         90         14         19           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         41         49         39           Manganese         ppm         ASTM D5185m         0         <1	Γin	ppm	ASTM D5185m	>15	0	8	<1
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         90         14         19           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1	/anadium	ppm	ASTM D5185m		<1	0	<1
Soron   ppm   ASTM D5185m   0   90   14   19   19   19   19   19   19   10   10	Cadmium	ppm	ASTM D5185m		0	0	0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         41         49         39           Manganese         ppm         ASTM D5185m         0         <1         2         <1           Magnesium         ppm         ASTM D5185m         1010         713         638         874           Calcium         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1150         685         1036         831           Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         25         28         24           Godium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7414	Boron	ppm	ASTM D5185m	0	90	14	19
Manganese         ppm         ASTM D5185m         0         <1         2         <1           Magnesium         ppm         ASTM D5185m         1010         713         638         874           Calcium         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1150         685         1036         831           Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         25         28         24           Sodium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/:mm         *A	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium         ppm         ASTM D5185m         1010         713         638         874           Calcium         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1150         685         1036         831           Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Gulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Golium         ppm         ASTM D5185m         >25         25         28         24           Godium         ppm         ASTM D5185m         20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Goot %         %         *ASTM D7844         >3         0.5         4.6         1.3           Nitration         Abs/.1mm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM	Molybdenum	ppm	ASTM D5185m	60	41	49	39
Calcium         ppm         ASTM D5185m         1070         1327         1725         1421           Phosphorus         ppm         ASTM D5185m         1150         685         1036         831           Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         25         28         24           Solium         ppm         ASTM D5185m         2         11         3         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         4.6         1.3           Nitration         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         meth	Manganese	ppm	ASTM D5185m	0	<1	2	<1
Phosphorus         ppm         ASTM D5185m         1150         685         1036         831           Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         25         28         24           Sodium         ppm         ASTM D5185m         2         11         3         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         4.6         1.3           Nitration         Abs/cm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Dxidation         Abs/.1mm <td< td=""><td>Magnesium</td><td>ppm</td><td>ASTM D5185m</td><td>1010</td><td>713</td><td>638</td><td>874</td></td<>	Magnesium	ppm	ASTM D5185m	1010	713	638	874
Zinc         ppm         ASTM D5185m         1270         789         1306         1017           Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         25         28         24           Sodium         ppm         ASTM D5185m         2         11         3         3         27         8           INFRA-RED         method         limit/base         current         history1         history2           Goot %         %         *ASTM D7844         >3         0.5         4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Dxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Calcium	ppm	ASTM D5185m	1070	1327	1725	1421
Sulfur         ppm         ASTM D5185m         2060         2861         2716         3616           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 25         ▲ 28         24           Sodium         ppm         ASTM D5185m         2         11         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Phosphorus	ppm	ASTM D5185m	1150	685	1036	831
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ≥25         ≥28         24           Sodium         ppm         ASTM D5185m         2         11         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Zinc	ppm	ASTM D5185m	1270	789	1306	1017
Solicon         ppm         ASTM D5185m         >25         ▲ 25         ▲ 28         24           Sodium         ppm         ASTM D5185m         2         11         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Sulfur	ppm	ASTM D5185m	2060	2861	2716	3616
Sodium         ppm         ASTM D5185m         2         11         3           Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Vitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         7         27         8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Silicon	ppm	ASTM D5185m	>25	<u>^</u> 25	<u>^</u> 28	24
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Sodium	ppm	ASTM D5185m		2	11	3
Soot %         %         *ASTM D7844         >3         0.5         ▲ 4.6         1.3           Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Potassium	ppm	ASTM D5185m	>20	7	27	8
Nitration         Abs/cm         *ASTM D7624         >20         7.5         17.4         13.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         35.1         28.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         12.2         26.9         18.6	Soot %	%	*ASTM D7844	>3	0.5	<b>4.6</b>	1.3
FLUID DEGRADATION     method     limit/base     current     history1     history2       Dxidation     Abs/.1mm     *ASTM D7414     >25     12.2     26.9     18.6	Nitration	Abs/cm	*ASTM D7624	>20	7.5	17.4	13.3
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.4	35.1	28.4
	FLUID DEGRAI	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	12.2	26.9	18.6



# **OIL ANALYSIS REPORT**



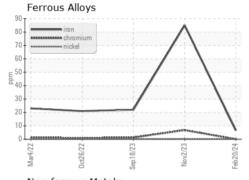


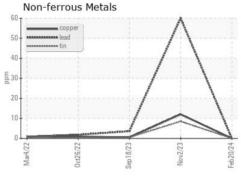


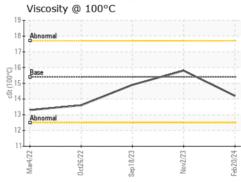
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

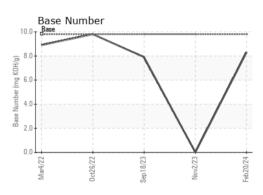
FLUID PROPE	ERIJE9	method	ilmit/base	current	nistory i	nistory2
Visc @ 100°C	cSt	ASTM D445	15.4	14.2	15.8	14.9

#### **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number : 06103592 Unique Number : 10901822

: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Test Package : FLEET

: GFL0051025

Received **Tested** Diagnosed

: 29 Feb 2024 : 01 Mar 2024 - Don Baldridge

: 28 Feb 2024

GFL Environmental - 632 - SWD Harrison

4102 Industrail Pkwy Harrison, MI US 48625

Contact: RON TROJANEK

rtrojanek@gflenv.com

To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - 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)

T:

F: