

# **OIL ANALYSIS REPORT**

# Sample Rating Trend





Machine Id 911036 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

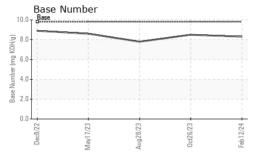
# **Fluid Condition**

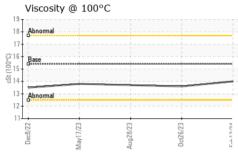
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Date	N SHP 15W40 (	- GAL)	Dec2022	May2023	Aug2023 Oct2023	Feb 2024	
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		GFL0101071	GFL0092771	GFL0080827
Oil Age         hrs         Client Info         600         848         600           Oil Changed         Client Info         N/A         N/A         N/A         Not Changed           Sample Status         NORMAL         NORMAL         NORMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           Water         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM DS185m         >120         4         7         8           Chromium         ppm         ASTM DS185m         >120         4         7         8           Chromium         ppm         ASTM DS185m         >20         4         7         8           Chromium         ppm         ASTM DS185m         >22         4         7         8           Chromium         ppm         ASTM DS185m         >20         1 </td <td>Sample Date</td> <td></td> <td>Client Info</td> <td></td> <th>12 Feb 2024</th> <td>26 Oct 2023</td> <td>28 Aug 2023</td>	Sample Date		Client Info		12 Feb 2024	26 Oct 2023	28 Aug 2023
Cilichanged   Cilicht Info   N/A   N/A   NORMAL   NORMA	Machine Age	hrs	Client Info		16054	16054	15807
CONTAMINATION	Oil Age	hrs	Client Info		600	848	600
Fuel	Oil Changed		Client Info		N/A	N/A	Not Changd
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
Water Glycol         WC Method         >0.2         NEG NEG NEG         NEG NEG         NEG NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         4         7         8           Chromium         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >5         1         2         <1           Silver         ppm         ASTM D5185m         >2         <1         0         0           Silver         ppm         ASTM D5185m         >2         <1         <1         0           Aluminum         ppm         ASTM D5185m         >2         <1         <1         0           Aluminum         ppm         ASTM D5185m         >40         1         <1         0           Copper         ppm         ASTM D5185m         >40         1         <1         <1           Vanadium         ppm         ASTM D5185m         >15         <1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >1 </th <th>CONTAMINAT</th> <th>ION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	4	7	8
Description	Chromium		ASTM D5185m	>20	<1	<1	<1
Description	Nickel				1	2	<1
Silver	Titanium		ASTM D5185m	>2	<1	0	0
Aluminum         ppm         ASTM D5185m         >20         1         1         4           Lead         ppm         ASTM D5185m         >40         1         <1	Silver		ASTM D5185m	>2	<1	<1	0
Lead	Aluminum		ASTM D5185m	>20	1	1	4
Copper	Lead				1	<1	0
STIN   ppm   ASTM D5185m   >15   <1   <1   <1   <1   <1   <1   <1	Copper		ASTM D5185m	>330	<1	2	<1
Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         3         6         20           Barium         ppm         ASTM D5185m         0         0         4         0           Molybdenum         ppm         ASTM D5185m         0         0         4         0           Molybdenum         ppm         ASTM D5185m         0         0         4         0           Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         h				>15	<1	<1	<1
ADDITIVES	Vanadium		ASTM D5185m		<1	0	0
Boron   ppm   ASTM D5185m   0   0   0   4   0	Cadmium				<1	<1	0
Barium         ppm         ASTM D5185m         0         0         4         0           Molybdenum         ppm         ASTM D5185m         60         59         64         67           Manganese         ppm         ASTM D5185m         0         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         59         64         67           Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         892         870         970           Calcium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844 <t< td=""><td>Boron</td><td>ppm</td><td>ASTM D5185m</td><td>0</td><th>3</th><td>6</td><td>20</td></t<>	Boron	ppm	ASTM D5185m	0	3	6	20
Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         892         870         970           Calcium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D741	Barium	ppm	ASTM D5185m	0	0	4	0
Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         892         870         970           Calcium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D741	Molybdenum	ppm	ASTM D5185m	60	59	64	67
Magnesium         ppm         ASTM D5185m         1010         892         870         970           Calcium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         *ASTM D7414 <td>•</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>&lt;1</th> <td>0</td> <td>&lt;1</td>	•	ppm	ASTM D5185m	0	<1	0	<1
Calcium         ppm         ASTM D5185m         1070         1005         1056         1114           Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Soliicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION <td>-</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1010</td> <th>892</th> <td>870</td> <td>970</td>	-	ppm	ASTM D5185m	1010	892	870	970
Phosphorus         ppm         ASTM D5185m         1150         978         920         1000           Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method	Calcium		ASTM D5185m	1070	1005	1056	1114
Zinc         ppm         ASTM D5185m         1270         1128         1168         1245           Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         >20         1         1         0           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm	Phosphorus						1000
Sulfur         ppm         ASTM D5185m         2060         3357         3027         3435           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         0         0         2           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5			ASTM D5185m	1270	1128	1168	1245
Silicon         ppm         ASTM D5185m         >25         4         4         5           Sodium         ppm         ASTM D5185m         0         0         2           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	Sulfur			2060	3357		3435
Sodium         ppm         ASTM D5185m         0         0         2           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	CONTAMINAN	TS	method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         0         0         2           Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	Silicon	ppm	ASTM D5185m	>25	4	4	5
Potassium         ppm         ASTM D5185m         >20         1         1         0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	Sodium		ASTM D5185m		0	0	2
Soot %         %         *ASTM D7844 >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624 >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415 >30         18.8         19.6         19.7           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         14.6         15.5         15.5			ASTM D5185m	>20		1	0
Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.0         7.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5	Soot %	%	*ASTM D7844	>4	0.2	0.3	0.3
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.8         19.6         19.7           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.5         15.5							
Oxidation Abs/.1mm *ASTM D7414 >25 <b>14.6</b> 15.5 15.5							
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.6	15.5	15.5
	Base Number (BN)	mg KOH/g			8.3	8.5	7.8



# **OIL ANALYSIS REPORT**

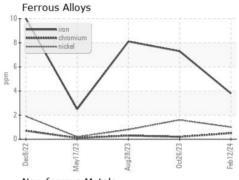


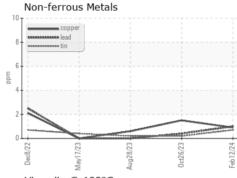


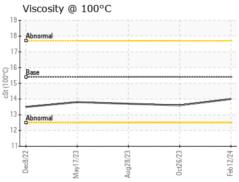
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

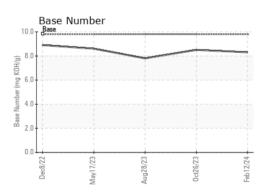
FLUID PROPI	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.4	14.0	13.6	13.7

## **GRAPHS**













Laboratory Sample No.

: GFL0101071 Lab Number : 06090815 Unique Number: 10883668 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 15 Feb 2024 **Tested** : 19 Feb 2024

Diagnosed : 19 Feb 2024 - Wes Davis GFL Environmental - 455 - Flint

2051 W. Bristol Rd Flint Township, MI US 48507

Contact: MARK WOMBLE mwomble@gflenv.com

T: (586)825-9514

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)