

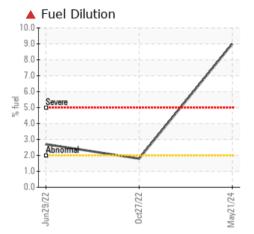
# **PROBLEM SUMMARY**

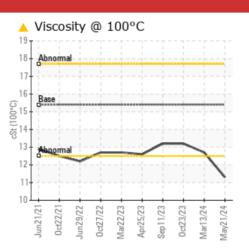
Machine Id

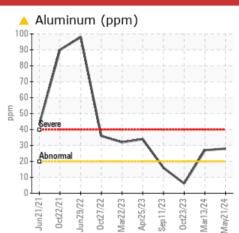
411015 Component Diesel Engine

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

## COMPONENT CONDITION SUMMARY







### RECOMMENDATION

We advise that you check the fuel injection system. We recommend that you drain the oil from the component if this has not already been done. Resample at the next service interval to monitor. ( Customer Sample Comment: Sample only )

PROBLEMATIC TEST RESULTS								
Sample Status				SEVERE	ABNORMAL	NORMAL		
Aluminum	ppm	ASTM D5185m	>20	<u> </u>	<b>A</b> 27	6		
Fuel	%	ASTM D3524	>2.0	<b>9</b> .0	<1.0	<1.0		
Visc @ 100°C	cSt	ASTM D445	15.4	<u> </u>	12.7	13.2		

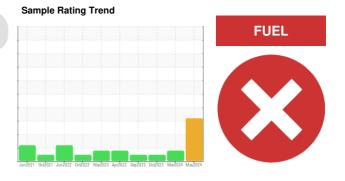
Customer Id: GFL625 Sample No.: GFL0116298 Lab Number: 06191622 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Angela Borella +1 800-237-1369 angela.borella@wearcheckusa.com

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com



RECOMMENDE	D ACTIONS			
Action	Status	Date	Done By	Description
Change Fluid			?	We recommend that you drain the oil from the component if this has not already been done.
Check Fuel/injector System			?	We advise that you check the fuel injection system.

## HISTORICAL DIAGNOSIS



# 13 Mar 2024 Diag: Jonathan Hester

No corrective action is recommended at this time. Resample at the next service interval to monitor. The aluminum level is abnormal. All other component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



view report





Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



#### 11 Sep 2023 Diag: Wes Davis

Resample at the next service interval to monitor All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

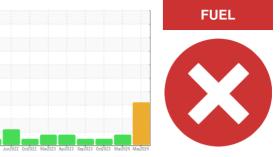






# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id

# **411015**

#### Component Diesel Engine Fluid PETRO CANADA DURON SHP 15W40 (--- GAL)

### DIAGNOSIS

### Recommendation

We advise that you check the fuel injection system. We recommend that you drain the oil from the component if this has not already been done. Resample at the next service interval to monitor. ( Customer Sample Comment: Sample only )

### A Wear

The aluminum level is abnormal. All other component wear rates are normal.

### Contamination

There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

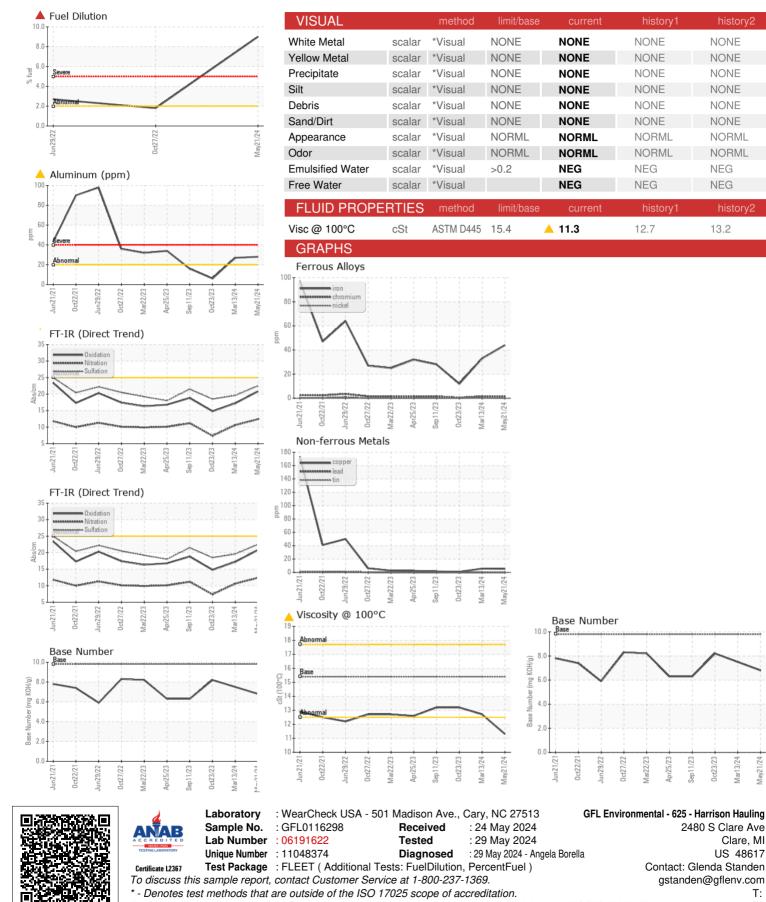
### Fluid Condition

Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is suitable alkalinity remaining in the oil.

Sample Date         Client Info         21 May 2024         13 Mar 2024         23 Oct 2023           Machine Age         hrs         Client Info         5016         4793         4430           Oil Age         hrs         Client Info         171         364         182           Oil Changed         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Sample Status         Client Info         Not Changd         ABNORMAL         NORMAL         Nort Changd           Water         WC Method         >0.2         NEG         NEG         NEG           Wear METALS         method         Imit/base         current         history1         history2           Iron         ppm         ASTM 05185m         >100         44         33         12           Chromium         ppm         ASTM 05185m         >4         0         <1         <1           Nickel         ppm         ASTM 05185m         >3         0         0         0           Auminum         ppm         ASTM 05185m         >30         5         6         <1         <1           Vickel         ppm         ASTM 05185m         >30         0         0	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         5016         4793         4430           Oil Age         hrs         Client Info         171         364         182           Oil Changed         Client Info         Not Changd         Not Changd         Changed           Sample Status         Imit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Wear         WC Method         >0.2         1         2         <1         1           Itron         ppm         ASTM D5185m         >4         0         <1         <1         1           Silver         ppm         ASTM D5185m         >3         0         0         0         <1         0           Silver         ppm         ASTM D5185m         >30         0         0         0         <1         0	Sample Number		Client Info		GFL0116298	GFL0101654	GFL0088298
Oil Age         hrs         Client Info         171         364         182           Oil Changed         Client Info         Not Changd         Not Changd         Changed           Sample Status         Imit Not Changd         Not Changd         Not Changd         Not Changd           CONTAMINATION         method         Imit Nase         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         >20         NEG         NEG         NEG           Water         WC Method         >20         1         2         <1           Kickel         ppm         ASTM D5185m         >100         44         33         12           Chromium         ppm         ASTM D5185m         >3         0         0         0           Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm	Sample Date		Client Info		21 May 2024	13 Mar 2024	23 Oct 2023
Oil Changed Sample Status         Client Info         Not Changd SEVERE         Not Changd ABNORMAL         Changed NORMAL           CONTAMINATION         method         imit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Water         WC Method         >0.2         NEG         NEG         NEG           Wear         WC Method         >0.2         NEG         NEG         NEG           Wear         WC Method         >0.2         NEG         NEG         NEG           Iron         ppm         ASTM D5185m<>10.0         44         33         12           Chromium         ppm         ASTM D5185m<>20         1         2.1         <1           Nickel         ppm         ASTM D5185m<>3.3         0         0         0           Lead         ppm         ASTM D5185m<>3.30         5         6         <1         0           Vanadium         ppm         ASTM D5185m         >1.0         0         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         1         1           Lead         ppm<	Machine Age	hrs	Client Info		5016	4793	4430
Sample Status         SEVERE         ABNORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         44         33         12           Chromium         ppm         ASTM D5185m         >4         0         <1         <1           Nickel         ppm         ASTM D5185m         >4         0         <1         <1           Silver         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >40         0         0         0         <1           Cadmium         ppm         ASTM D5185m         >15         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         33         3           Baron <th>Oil Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>171</th> <th>364</th> <th>182</th>	Oil Age	hrs	Client Info		171	364	182
CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         44         33         12           Chromium         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >3         0         0         0           Silver         ppm         ASTM D5185m         >20         28         27         6           Lead         ppm         ASTM D5185m         >30         0         0         0           Capper         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         0         4         3         3           Boron         ppm         ASTM D5185m         0         4         3         3	Oil Changed		Client Info		Not Changd	Not Changd	Changed
Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         linit/base         current         history1         history2           tron         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >20         1         2         <1           Silver         ppm         ASTM D5185m         >3         0         0         <1           Silver         ppm         ASTM D5185m         >40         0         0         0           Aluminum         ppm         ASTM D5185m         >30         5         6         <1         0           Copper         ppm         ASTM D5185m         >30         5         0         <1         0           Vanadium         ppm         ASTM D5185m         >15         0         <1         0         <1           ASTM D5185m         0         0         0         0         3         3           Barium         ppm         ASTM D5185m         0         <1	Sample Status				SEVERE	ABNORMAL	NORMAL
Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         44         33         12           Chromium         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >20         0         0         <1           Silver         ppm         ASTM D5185m         >3         0         0         0           Lead         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         0         0         0           Vanadium         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         3         3	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >20         1         2         <1           Silver         ppm         ASTM D5185m         >3         0         0         0           Lead         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         5         6         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0         0         0           Copper         ppm         ASTM D5185m         0         0         0         0         0         0         0         0         0         0         3         0         0         0         0         0         0         0         0 <th>Water</th> <th></th> <th>WC Method</th> <th>&gt;0.2</th> <th>NEG</th> <th>NEG</th> <th>NEG</th>	Water		WC Method	>0.2	NEG	NEG	NEG
Iron         ppm         ASTM D5185m         >100         44         33         12           Chromium         ppm         ASTM D5185m         >20         1         2         <1           Nickel         ppm         ASTM D5185m         >4         0         <1         <1           Titanium         ppm         ASTM D5185m         >3         0         0         <1           Silver         ppm         ASTM D5185m         >3         0         0         0           Auminum         ppm         ASTM D5185m         >30         5         6         <1           Lead         ppm         ASTM D5185m         >330         5         6         <1         0           Vanadium         ppm         ASTM D5185m         >330         5         6         <1         0           Vanadium         ppm         ASTM D5185m         0         44         3         3         3           Boron         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         <1         <1         0           Molybdenum         ppm         ASTM D5185m	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         1         2         <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel         ppm         ASTM D5185m         >4         0         <1	Iron	ppm	ASTM D5185m	>100	44	33	12
Titanium         ppm         ASTM D5185m         0         0         <1	Chromium	ppm	ASTM D5185m	>20	1	2	<1
Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >20         ▲ 28         ▲ 27         6           Lead         ppm         ASTM D5185m         >20         ▲ 28         ▲ 27         6           Copper         ppm         ASTM D5185m         >330         5         6         <1	Nickel	ppm	ASTM D5185m	>4	0	<1	<1
Aluminum         ppm         ASTM D5185m         >20         ▲ 28         ▲ 27         6           Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         5         6         <1           Tin         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         4         3         3           Boron         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         1         0           Magnesse         ppm         ASTM D5185m         0         4         1         1075           Phosphorus         ppm         ASTM D5185m         1070         1007         1134 <t< th=""><th>Titanium</th><td>ppm</td><td>ASTM D5185m</td><td></td><th>0</th><td>0</td><td>&lt;1</td></t<>	Titanium	ppm	ASTM D5185m		0	0	<1
Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         5         6         <1           Tin         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         >15         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         0         <1         <1         1         0           Magnesium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1270         1162 <th>Silver</th> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;3</td> <th>0</th> <td>0</td> <td>0</td>	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper         ppm         ASTM D5185m         >330         5         6         <1	Aluminum	ppm	ASTM D5185m	>20	<u> </u>	<u> </u>	6
Tin         ppm         ASTM D5185m         >15         0         <1	Lead	ppm	ASTM D5185m	>40	-	0	0
Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         <1	Copper	ppm	ASTM D5185m	>330	5	6	<1
Cadmium         ppm         ASTM D5185m         0 <th>Tin</th> <td>ppm</td> <td></td> <td>&gt;15</td> <th>-</th> <td></td> <td></td>	Tin	ppm		>15	-		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         0         0         3           Molybdenum         ppm         ASTM D5185m         60         58         63         63           Magnesium         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         22         3         0         0           Potassium         ppm         ASTM D5185m         20 </th <th>Vanadium</th> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>0</th> <td>0</td> <td>0</td>	Vanadium	ppm	ASTM D5185m		0	0	0
Boron         ppm         ASTM D5185m         0         4         3         3           Barium         ppm         ASTM D5185m         0         0         0         3           Molybdenum         ppm         ASTM D5185m         60         58         63         63           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D5185m         >20<	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium         ppm         ASTM D5185m         0         0         0         3           Molybdenum         ppm         ASTM D5185m         60         58         63         63           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D5185m         >20         17         16         9           Sootiw         %         *ASTM D7844	ADDIT <u>IVES</u>		method	limit/base	current	historv1	history2
Molybdenum         ppm         ASTM D5185m         60         58         63         63           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1070         1007         1134         973           Zinc         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         20         3         0           Potassium         ppm         ASTM D5185m         20         17         16         9           Fuel         %         ASTM D5854         >2.0         9.0         <1.0         <1.0           INFRA-RED         method         limit/base         curre			mounou		ourront		
Maganese         ppm         ASTM D5185m         0         <1	Boron	ppm			4	3	3
Magnesium         ppm         ASTM D5185m         1010         876         979         900           Calcium         ppm         ASTM D5185m         1070         1007         1134         1075           Phosphorus         ppm         ASTM D5185m         1150         962         1148         973           Zinc         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         22         3         0           Potassium         ppm         ASTM D5185m         20         17         16         9           Fuel         %         ASTM D524         >2.0         9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm< *ASTM D7644         >30         22.5<	Boron Barium		ASTM D5185m ASTM D5185m	0	4 0	3	3
Calcium       ppm       ASTM D5185m       1070       1007       1134       1075         Phosphorus       ppm       ASTM D5185m       1150       962       1148       973         Zinc       ppm       ASTM D5185m       1270       1162       1302       1214         Sulfur       ppm       ASTM D5185m       2060       3011       3481       3243         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >25       5       6       3         Sodium       ppm       ASTM D5185m       >20       17       16       9         Fuel       %       ASTM D5185m       >20       17       16       9         Fuel       %       ASTM D5185m       >20       17       0.0       <1.0         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       >3       1       0.7       0.2         Nitration       Abs/cm       *ASTM D7414       >30       22.5       19.6       18.5         FLUID DEGRADATION m	Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	4 0 58	3 0 63	3 3 63
Phosphorus         ppm         ASTM D5185m         1150         962         1148         973           Zinc         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         6         3           Sodium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D3524         >2.0         ▲ 9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.tmm<*ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base	Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	4 0 58 <1	3 0 63 <1	3 3 63 0
Zinc         ppm         ASTM D5185m         1270         1162         1302         1214           Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         6         3           Sodium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D3524         >2.0         ▲ 9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.tmm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.tmm         *ASTM	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	4 0 58 <1 876	3 0 63 <1 979	3 3 63 0 900
Sulfur         ppm         ASTM D5185m         2060         3011         3481         3243           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         6         3           Sodium         ppm         ASTM D5185m         >25         5         6         3           Potassium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D524         >2.0         9.0         <1.0	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	4 0 58 <1 876 1007	3 0 63 <1 979 1134	3 3 63 0 900 1075
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m<>25         5         6         3         3         0           Sodium         ppm         ASTM D5185m<>20         17         16         9         9           Potassium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D3524         >2.0         ● 9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.tmm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.tmm         *ASTM D7414         >25         20.8         17.2         14.8	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 ASTM D5185m	0 0 60 0 1010 1070 1150	4 0 58 <1 876 1007 962	3 0 63 <1 979 1134 1148	3 3 63 0 900 1075 973
Silicon         ppm         ASTM D5185m         >25         5         6         3           Sodium         ppm         ASTM D5185m         2         3         0           Potassium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D3524         >2.0         ▲ 9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	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	4 0 58 <1 876 1007 962 1162	3 0 63 <1 979 1134 1148 1302	3 3 63 0 900 1075 973 1214
Sodium         ppm         ASTM D5185m         2         3         0           Potassium         ppm         ASTM D5185m<>20         17         16         9           Fuel         %         ASTM D5185m<>20         17         16         9           Fuel         %         ASTM D5185m<>20         ▲ 9.0         <1.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844<>3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624<>20         12.4         10.6         7.4           Sulfation         Abs/.1mm         *ASTM D7415<>30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414<>25         20.8         17.2         14.8	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 ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	4 0 58 <1 876 1007 962 1162	3 0 63 <1 979 1134 1148 1302 3481	3 3 63 0 900 1075 973 1214 3243
Potassium         ppm         ASTM D5185m         >20         17         16         9           Fuel         %         ASTM D3524         >2.0         ▲ 9.0         <1.0	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	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	4 0 58 <1 876 1007 962 1162 3011 current	3 0 63 <1 979 1134 1148 1302 3481 history1	3 3 63 0 900 1075 973 1214 3243 history2
Fuel         %         ASTM D3524         >2.0         ▲ 9.0         <1.0	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b>	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	4 0 58 <1 876 1007 962 1162 3011 <u>current</u> 5	3 0 63 <1 979 1134 1148 1302 3481 history1 6	3 3 63 0 900 1075 973 1214 3243 history2 3
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.tmm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.tmm         *ASTM D7414         >25         20.8         17.2         14.8	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 ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 <b>limit/base</b>	4 0 58 <1 876 1007 962 1162 3011 <u>current</u> 5 2	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3	3 3 63 0 900 1075 973 1214 3243 history2 3 0
Soot %         %         *ASTM D7844         >3         1         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25	4 0 58 <1 876 1007 962 1162 3011 <u>current</u> 5 2 2 17	3 0 63 <1 979 1134 1148 1302 3481 <b>history1</b> 6 3 16	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9
Nitration         Abs/cm         *ASTM D7624         >20         12.4         10.6         7.4           Sulfation         Abs/.1mm         *ASTM D7615         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 <b>Imit/base</b> >25 >20 >20	4 0 58 <1 876 1007 962 1162 3011 current 5 2 17 17 9.0	3 0 63 <1 979 1134 1148 1302 3481 <b>history1</b> 6 3 16 <1.0	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0
Sulfation         Abs/.1mm         *ASTM D7415         >30         22.5         19.6         18.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 >25 >20 >20 >20 >20 >20	4 0 58 <1 876 1007 962 1162 3011 <b>current</b> 5 2 17 2 17 9.0	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 16 <1.0 history1	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2
FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 225 >20 >20 >20 >20 >20	4 0 58 <1 876 1007 962 1162 3011 <b>current</b> 5 2 17 5 2 17 9.0 <b>current</b>	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 16 <1.0 history1 0.7	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2 0.2
Oxidation         Abs/.1mm         *ASTM D7414         >25         20.8         17.2         14.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel 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 2060 225 >20 >20 >20 imit/base >3 >20	4 0 58 <1 876 1007 962 1162 3011 <b>current</b> 5 2 17 9.0 <b>current</b> 1 12.4	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 16 <1.0 history1 0.7 10.6	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2 0.2 7.4
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel 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 2060 225 >20 >20 >20 imit/base >3 >20	4 0 58 <1 876 1007 962 1162 3011 <b>current</b> 5 2 17 9.0 <b>current</b> 1 12.4	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 16 <1.0 history1 0.7 10.6	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2 0.2 7.4
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         6.8         7.5         8.2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel 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 2060 225 20 >20 >20 >20 >20 >20 >20 >20 >20 >20	4 0 58 <1 876 1007 962 1162 3011 <b>current</b> 5 2 17 \$ 9.0 <b>current</b> 1 12.4 22.5	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 16 <1.0 history1 0.7 10.6 19.6	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2 0.2 7.4
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE Oxidation	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 20 >20 >20 <b>imit/base</b> >3 >20 >30	4 0 58 <1 876 1007 962 1162 3011 Current 5 2 17 9.0 Current 1 12.4 22.5 Current	3 0 63 <1 979 1134 1148 1302 3481 history1 6 3 3481 6 3 16 <1.0 history1 0.7 10.6 19.6 19.6 history1	3 3 63 0 900 1075 973 1214 3243 history2 3 0 9 <1.0 history2 0.2 7.4 18.5 history2



# **OIL ANALYSIS REPORT**



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

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Submitted By: also GFL632 and GFL638 - Glenda Standen

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NONE

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