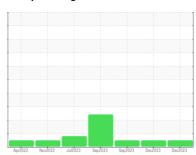


# **OIL ANALYSIS REPORT**

## Sample Rating Trend









PETRO CANADA DURON SHP 15W40 (36 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

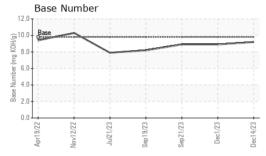
## **Fluid Condition**

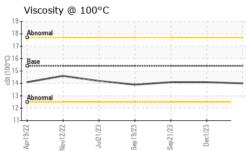
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| Sample Date         Client Info         14 Dec 2023         01 Dec 2023         21 Sep 2023           Machine Age         hrs         Client Info         15644         15500         15010           Oil Age         hrs         Client Info         8080         15500         0           Oil Changed         Client Info         N/A         Changed         Changed           Sample Status         NORMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Water         WC Method         NEG         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >65         0         5         5           Chromium         ppm         ASTM D5185m         >5         0         <1         <1           Nickel         ppm         ASTM D5185m         >5 </th <th></th> <th></th> <th>Apr2022</th> <th>NOVZUZZ JUIZUZ3</th> <th>Sep2023 Sep2023 Dec2023</th> <th>Dec2023</th> <th></th>  |                  |          | Apr2022     | NOVZUZZ JUIZUZ3 | Sep2023 Sep2023 Dec2023 | Dec2023     |             |
|---|------------------|----------|-------------|-----------------|-------------------------|-------------|-------------|
| Sample Date   | SAMPLE INFORM    | MATION   | method      | limit/base      | current                 | history1    | history2    |
| Machine Age   hrs   Client Info   15644   15500   15010   15010   15010   15010   15010   15010   15000   15000   0   0   15000   0   0   0   15000   0   0   0   0   0   0   0   0   0   | Sample Number    |          | Client Info |                 | GFL0104148              | GFL0104388  | GFL0085050  |
| Oil Age         hrs         Client Info         8080         15500         0           Oil Changed         Client Info         N/A         Changed         Changed           Sample Status         NORMAL   | Sample Date      |          | Client Info |                 | 14 Dec 2023             | 01 Dec 2023 | 21 Sep 2023 |
| Oil Changed   Client Info   N/A   N/A | Machine Age      | hrs      | Client Info |                 | 15644                   | 15500       | 15010       |
| NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history2   history2   | Oil Age          | hrs      | Client Info |                 | 8080                    | 15500       | 0           |
| Fuel  | Oil Changed      |          | Client Info |                 | N/A                     | Changed     | Changed     |
| Fuel  | Sample Status    |          |             |                 | NORMAL                  | NORMAL      | NORMAL      |
| Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         Imitibase         current         history1         history2           WEAR METALS         method         limitibase         current         history1         history2           Iron         ppm         ASTM D5185m         >5         0         <1         <1           Nickel         ppm         ASTM D5185m         >3         <1         <1         0           Silver         ppm         ASTM D5185m         >3         <1         <1         0           Silver         ppm         ASTM D5185m         >5         0         18         0           Silver         ppm         ASTM D5185m         >35         <1         2         1           Lead         ppm         ASTM D5185m         >10         0         <1         0           Copper         ppm         ASTM D5185m         >8         0         0         <1           Vanadium         ppm         ASTM D5185m         0         0         0         <1           Vanadium         ppm         ASTM D5185m         0         0         <1         0 </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         |
| Iron  | Glycol           |          | WC Method   |                 | NEG                     | NEG         | NEG         |
| Chromium         ppm         ASTM D5185m         >5         0         <1  | WEAR METAL       | S        | method      | limit/base      | current                 | history1    | history2    |
| Nickel  | Iron             | ppm      | ASTM D5185m | >65             | 0                       | 5           | 5           |
| Titanium         ppm         ASTM D5185m         >5         0         18         0           Silver         ppm         ASTM D5185m         >5         0         0         0           Aluminum         ppm         ASTM D5185m         >35         <1         2         1           Lead         ppm         ASTM D5185m         >10         0         <1         0           Copper         ppm         ASTM D5185m         >180         <1         2         2           Vanadium         ppm         ASTM D5185m         >8         0         0         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         0         0           Vanadium         ppm         ASTM D5185m         0         5         167         3           Barium         ppm         ASTM D5185m         0         5         167         3           Barium         ppm         ASTM D5185m         0         5         4         5         6         6           Magnesium         ppm   | Chromium         | ppm      | ASTM D5185m | >5              | 0                       | <1          | <1          |
| Silver  | Nickel           | ppm      | ASTM D5185m | >3              | <1                      | <1          | 0           |
| Aluminum         ppm         ASTM D5185m         >35         <1         2         1           Lead         ppm         ASTM D5185m         >10         0         <1   | Titanium         | ppm      | ASTM D5185m | >5              | 0                       | 18          | 0           |
| Lead         ppm         ASTM D5185m         >10         0         <1         0           Copper         ppm         ASTM D5185m         >180         <1         2         2           Tin         ppm         ASTM D5185m         >8         0         0         <1           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         5         167         3           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1         0         0           Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         877         945         975           Calcium         ppm         ASTM D5185m         1070         982         1915   | Silver           | ppm      | ASTM D5185m | >2              | 0                       | 0           | 0           |
| Copper         ppm         ASTM D5185m         >180         <1         2         2           Tin         ppm         ASTM D5185m         >8         0         0         <1  | Aluminum         | ppm      | ASTM D5185m | >35             | <1                      | 2           | 1           |
| Tin   | Lead             | ppm      | ASTM D5185m | >10             | 0                       | <1          | 0           |
| Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         5         167         3           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         54         50         61           Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         877         945         975           Calcium         ppm         ASTM D5185m         1070         982         1915         1134           Phosphorus         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1   | Copper           | ppm      | ASTM D5185m | >180            | <1                      | 2           | 2           |
| Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         5         167         3           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1   | Tin              | ppm      | ASTM D5185m | >8              | 0                       | 0           | <1          |
| ADDITIVES   | Vanadium         | ppm      | ASTM D5185m |                 | 0                       | 0           | 0           |
| Boron   | Cadmium          | ppm      | ASTM D5185m |                 | 0                       | <1          | 0           |
| Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         54         50         61           Manganese         ppm         ASTM D5185m         0         <1  | ADDITIVES        |          | method      | limit/base      | current                 | history1    | history2    |
| Molybdenum         ppm         ASTM D5185m         60         54         50         61           Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         877         945         975           Calcium         ppm         ASTM D5185m         1070         982         1915         1134           Phosphorus         ppm         ASTM D5185m         1150         987         959         1090           Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current  | Boron            | ppm      | ASTM D5185m | 0               | 5                       | 167         | 3           |
| Manganese         ppm         ASTM D5185m         0         <1         0         <1           Magnesium         ppm         ASTM D5185m         1010         877         945         975           Calcium         ppm         ASTM D5185m         1070         982         1915         1134           Phosphorus         ppm         ASTM D5185m         1150         987         959         1090           Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         >20         2         4         2           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624  | Barium           | ppm      | ASTM D5185m | 0               | 0                       | 0           | 0           |
| Magnesium         ppm         ASTM D5185m         1010         877         945         975           Calcium         ppm         ASTM D5185m         1070         982         1915         1134           Phosphorus         ppm         ASTM D5185m         1150         987         959         1090           Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         >1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7415         >   | Molybdenum       | ppm      | ASTM D5185m | 60              | 54                      | 50          | 61          |
| Calcium         ppm         ASTM D5185m         1070         982         1915         1134           Phosphorus         ppm         ASTM D5185m         1150         987         959         1090           Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         >1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION         method         limit/base <td< td=""><td>Manganese</td><td>ppm</td><td>ASTM D5185m</td><td>0</td><th>&lt;1</th><td>0</td><td>&lt;1</td></td<>   | Manganese        | ppm      | ASTM D5185m | 0               | <1                      | 0           | <1          |
| Phosphorus         ppm         ASTM D5185m         1150         987         959         1090           Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         >1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION         *ASTM D7414   | Magnesium        | ppm      | ASTM D5185m | 1010            | 877                     | 945         | 975         |
| Zinc         ppm         ASTM D5185m         1270         1218         1082         1298           Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         >1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D   | Calcium          | ppm      | ASTM D5185m | 1070            | 982                     | 1915        | 1134        |
| Sulfur         ppm         ASTM D5185m         2060         3106         4801         3933           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9  | Phosphorus       | ppm      | ASTM D5185m | 1150            | 987                     | 959         | 1090        |
| CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9   | Zinc             | ppm      | ASTM D5185m | 1270            | 1218                    | 1082        | 1298        |
| Silicon         ppm         ASTM D5185m         >15         2         13         5           Sodium         ppm         ASTM D5185m         1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9  | Sulfur           | ppm      | ASTM D5185m | 2060            | 3106                    | 4801        | 3933        |
| Sodium         ppm         ASTM D5185m         1         2         5           Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9   | CONTAMINAN       | TS       | method      | limit/base      | current                 | history1    | history2    |
| Potassium         ppm         ASTM D5185m         >20         2         4         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9  | Silicon          | ppm      | ASTM D5185m | >15             | 2                       | 13          | 5           |
| INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9  | Sodium           | ppm      | ASTM D5185m |                 | 1                       | 2           | 5           |
| Soot %         %         *ASTM D7844 >3         0.1         0.1         0.3           Nitration         Abs/cm         *ASTM D7624 >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415 >30         17.3         17.9         17.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         13.4         13.7         12.9  | Potassium        | ppm      | ASTM D5185m | >20             | 2                       | 4           | 2           |
| Nitration         Abs/cm         *ASTM D7624         >20         4.7         5.9         5.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9  | INFRA-RED        |          | method      | limit/base      | current                 | history1    | history2    |
| Sulfation         Abs/.1mm         *ASTM D7415         >30         17.3         17.9         17.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.4         13.7         12.9   | Soot %           | %        | *ASTM D7844 | >3              | 0.1                     | 0.1         | 0.3         |
| FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.4     13.7     12.9   | Nitration        | Abs/cm   | *ASTM D7624 | >20             | 4.7                     | 5.9         | 5.7         |
| Oxidation Abs/.1mm *ASTM D7414 >25 <b>13.4</b> 13.7 12.9  | Sulfation        | Abs/.1mm | *ASTM D7415 | >30             | 17.3                    | 17.9        | 17.1        |
|   | FLUID DEGRAD     | DATION   | method      | limit/base      | current                 | history1    | history2    |
| Base Number (BN)   mg KOH/g   ASTM D2896   9.8   9.2   8.9   8.9  | Oxidation        | Abs/.1mm | *ASTM D7414 | >25             | 13.4                    | 13.7        | 12.9        |
|   | Base Number (BN) | mg KOH/g | ASTM D2896  | 9.8             | 9.2                     | 8.9         | 8.9         |



# **OIL ANALYSIS REPORT**

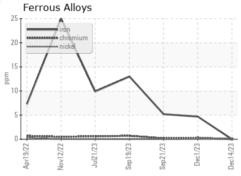


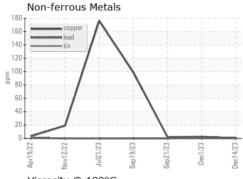


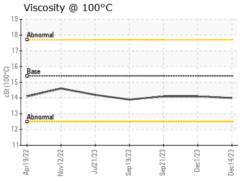
| VISUAL                  |        | method  | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal             | scalar | *Visual | NONE       | NONE    | NONE     | NONE     |
| Yellow Metal            | 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      |

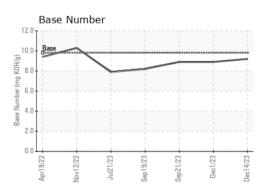
| FLUID PROPE  | RHES | method    | ilmit/base |      | nistory i | nistory2 |
|--------------|------|-----------|------------|------|-----------|----------|
| Visc @ 100°C | cSt  | ASTM D445 | 15.4       | 14.0 | 14.1      | 14.1     |

## **GRAPHS**













Certificate L2367

Laboratory

Sample No. Lab Number Unique Number : 10792513 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0104148 : 06037284

Recieved : 18 Dec 2023 Diagnosed : 18 Dec 2023 Diagnostician : Wes Davis

39000 Van Born Rd Wayne, MI US 48184 Contact: Belal Dgheish bdgheish@gflenv.com T: (734)714-2340

GFL Environmental - 410 - Michigan West

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)