

OIL ANALYSIS REPORT

Area (34717UA) 820048

Diesel Engine

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

Sample Rating Trend



DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

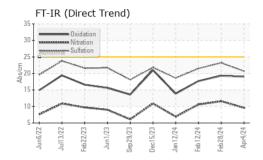
Fluid Condition

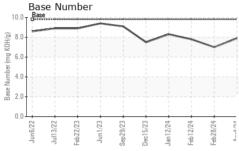
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

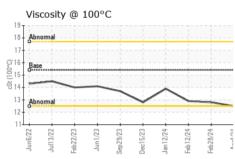
| SAMPLE INFORMATION method limit/base current history1 history2 | Jun2022 Jul2022 Feb2023 Jun2023 Sep2023 Dec2023 Jun2024 Feb2024 Feb2024 Feb2024 Feb2024 | | | | | | | |
|---|---|----------|-------------|------------|-------------|-------------|-------------|--|
| Sample Date | SAMPLE INFOR | MATION | method | limit/base | current | history1 | history2 | |
| Sample Date Client Info 12795 12476 12366 12760 12795 12476 12366 12796 12796 12476 12366 12796 12796 12476 12366 12796 12796 12476 12366 12796 12796 12476 12366 12796 12796 12476 12366 12796 12796 12476 12366 12796 | Sample Number | | Client Info | | GFL0116575 | GFL0111830 | GFL0108294 | |
| Machine Age hrs Client Info 12795 12476 12366 Oil Age hrs Client Info 319 12476 12366 Oil Changed Client Info Not Changd Changed Not Changd NoRMAL NORMAL CONTAMINATION method limit/bass current historyt history2 Fuel WC Method >5 <1.0 <1.0 <1.0 Water WC Method >5.2 NEG NEG NEG Glycol WC Method Imititibase NEG NEG NEG WEAR METALS method limit/bass current history1 history2 Iron pm ASTM D5185m >10 24 65 53 Chromium ppm ASTM D5185m >20 <1 2 2 Nickel ppm ASTM D5185m >20 <1 2 2 Silver ppm ASTM D5185m >20 3 13 | | | Client Info | | 04 Apr 2024 | 28 Feb 2024 | 12 Feb 2024 | |
| Oil Age hrs Client Info 319 12476 12366 Oil Changed Client Info Not Changd Changed Not Changed Sample Status Contamination Normal Normal Normal Normal CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 | | hrs | Client Info | | - | 12476 | 12366 | |
| Sample Status | • | hrs | Client Info | | 319 | 12476 | 12366 | |
| CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 24 65 53 Chromium ppm ASTM D5185m >20 <1 2 2 Nickel ppm ASTM D5185m >4 0 <1 <1 Silver ppm ASTM D5185m >3 0 0 0 Silver ppm ASTM D5185m >20 3 13 13 Lead ppm ASTM D5185m >330 <1 2 2 Copper ppm ASTM D5185m >30 <1 2 2 | Oil Changed | | Client Info | | Not Changd | Changed | Not Changd | |
| Fuel | Sample Status | | | | NORMAL | NORMAL | NORMAL | |
| Water Glycol WC Method Glycol NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 24 65 53 Chromium ppm ASTM D5185m >20 <1 2 2 Nickel ppm ASTM D5185m >4 0 <1 <1 Silver ppm ASTM D5185m >4 0 0 <1 Silver ppm ASTM D5185m >40 1 3 1 Silver ppm ASTM D5185m >20 3 13 13 Lead ppm ASTM D5185m >40 1 3 1 Copper ppm ASTM D5185m >15 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 1 | CONTAMINAT | ION | method | limit/base | current | history1 | history2 | |
| WEAR METALS | Fuel | | WC Method | >5 | <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 >20 <1 2 2 Nickel ppm ASTM D5185m >4 0 <1 | WEAR METAL | .S | method | limit/base | current | history1 | history2 | |
| Nickel | Iron | ppm | ASTM D5185m | >100 | 24 | 65 | 53 | |
| Titanium ppm ASTM D5185m 0 0 <1 | Chromium | ppm | ASTM D5185m | >20 | <1 | 2 | 2 | |
| Silver | Nickel | ppm | ASTM D5185m | >4 | 0 | <1 | <1 | |
| Aluminum ppm ASTM D5185m >20 3 13 13 Lead ppm ASTM D5185m >40 1 3 1 Copper ppm ASTM D5185m >330 <1 2 2 Tin ppm ASTM D5185m 0 <1 <1 0 Vanadium ppm ASTM D5185m 0 <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 12 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 1 <th>Titanium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th>0</th> <th><1</th> | Titanium | ppm | ASTM D5185m | | 0 | 0 | <1 | |
| Lead | Silver | ppm | ASTM D5185m | >3 | 0 | 0 | 0 | |
| Copper ppm ASTM D5185m >330 <1 | Aluminum | ppm | ASTM D5185m | >20 | 3 | 13 | 13 | |
| Tin ppm ASTM D5185m >15 0 <1 | Lead | ppm | ASTM D5185m | >40 | 1 | 3 | 1 | |
| Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 11 7 4 Barium ppm ASTM D5185m 0 0 0 12 Molybdenum ppm ASTM D5185m 0 0 1 <1 Magnesium ppm ASTM D5185m 1010 956 1050 873 Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current | Copper | ppm | ASTM D5185m | >330 | <1 | 2 | 2 | |
| Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 11 7 4 Barium ppm ASTM D5185m 0 0 0 12 Molybdenum ppm ASTM D5185m 0 0 0 1 Magnese ppm ASTM D5185m 0 0 1 <1 Magnesium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon | Tin | ppm | ASTM D5185m | >15 | 0 | <1 | <1 | |
| ADDITIVES | Vanadium | ppm | ASTM D5185m | | 0 | <1 | 0 | |
| Boron ppm ASTM D5185m 0 11 7 4 Barium ppm ASTM D5185m 0 0 0 12 Molybdenum ppm ASTM D5185m 60 58 57 59 Manganese ppm ASTM D5185m 0 0 1 <1 | Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 | |
| Barium ppm ASTM D5185m 0 0 0 12 Molybdenum ppm ASTM D5185m 60 58 57 59 Manganese ppm ASTM D5185m 0 0 1 <1 Magnesium ppm ASTM D5185m 1010 956 1050 873 Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m 4 6 3 Potassium ppm ASTM D5185m >20 <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th> | ADDITIVES | | method | limit/base | current | history1 | history2 | |
| Molybdenum ppm ASTM D5185m 60 58 57 59 Manganese ppm ASTM D5185m 0 0 1 <1 Magnesium ppm ASTM D5185m 1010 956 1050 873 Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 </td <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>11</th> <td>7</td> <td>4</td> | Boron | ppm | ASTM D5185m | 0 | 11 | 7 | 4 | |
| Manganese ppm ASTM D5185m 0 0 1 <1 Magnesium ppm ASTM D5185m 1010 956 1050 873 Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7 | Barium | ppm | ASTM D5185m | 0 | 0 | 0 | 12 | |
| Magnesium ppm ASTM D5185m 1010 956 1050 873 Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % "ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm "ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION "ASTM D7414 | Molybdenum | ppm | | | | 57 | | |
| Calcium ppm ASTM D5185m 1070 1171 1260 1058 Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >3 0.7 1.7 1.4 Nitration Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidati | Manganese | ppm | ASTM D5185m | | 0 | 1 | <1 | |
| Phosphorus ppm ASTM D5185m 1150 1064 978 982 Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm <th>0</th> <th>ppm</th> <th></th> <th></th> <th></th> <th></th> <th></th> | 0 | ppm | | | | | | |
| Zinc ppm ASTM D5185m 1270 1270 1405 1165 Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Calcium | ppm | ASTM D5185m | 1070 | | | 1058 | |
| Sulfur ppm ASTM D5185m 2060 3769 3199 3170 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m >25 3 6 3 Potassium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Phosphorus | ppm | ASTM D5185m | 1150 | | | | |
| CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m 4 6 3 Potassium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Zinc | ppm | ASTM D5185m | 1270 | 1270 | 1405 | 1165 | |
| Silicon ppm ASTM D5185m >25 3 6 7 Sodium ppm ASTM D5185m 4 6 3 Potassium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | | | ASTM D5185m | 2060 | 3769 | 3199 | 3170 | |
| Sodium ppm ASTM D5185m 4 6 3 Potassium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | CONTAMINAN | ITS | method | limit/base | current | history1 | history2 | |
| Potassium ppm ASTM D5185m >20 3 13 14 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | | | | >25 | 3 | | | |
| INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | | ppm | ASTM D5185m | | 4 | | 3 | |
| Soot % % *ASTM D7844 >3 0.7 1.7 1.4 Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Potassium | ppm | ASTM D5185m | >20 | 3 | 13 | 14 | |
| Nitration Abs/cm *ASTM D7624 >20 9.6 11.6 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | INFRA-RED | | method | limit/base | current | history1 | history2 | |
| Sulfation Abs/.1mm *ASTM D7415 >30 20.7 23.2 21.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Soot % | % | *ASTM D7844 | >3 | 0.7 | 1.7 | 1.4 | |
| FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Nitration | Abs/cm | *ASTM D7624 | >20 | 9.6 | 11.6 | 10.6 | |
| Oxidation Abs/.1mm *ASTM D7414 >25 19.0 19.3 17.7 | Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 20.7 | 23.2 | 21.5 | |
| | FLUID DEGRAI | NOITAC | method | limit/base | current | history1 | history2 | |
| Base Number (BN) mg KOH/g ASTM D2896 9.8 7.9 7.0 7.8 | Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 19.0 | 19.3 | 17.7 | |
| | Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | 7.9 | 7.0 | 7.8 | |



OIL ANALYSIS REPORT



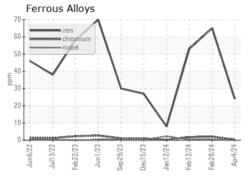




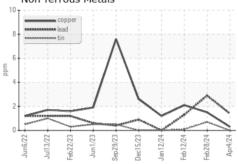
| VISUAL | | method | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Precipitate | 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 |
| Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| Free Water | scalar | *Visual | | NEG | NEG | NEG |

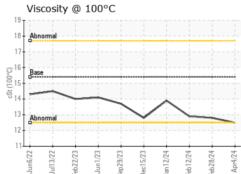
| FLUID PROPE | ERTIES | method | | | | history2 |
|--------------|--------|-----------|------|------|------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | 12.5 | 12.8 | 12.9 |

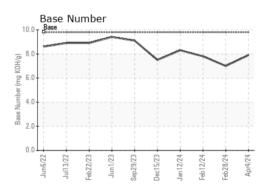
GRAPHS















Certificate 12367

Laboratory Sample No. Lab Number : 06139681 Unique Number : 10964489 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0116575

Received **Tested** Diagnosed

: 05 Apr 2024 : 06 Apr 2024 : 06 Apr 2024 - Wes Davis

GFL Environmental - 652 - Fredericksburg Hauling 10954 Houser Drive Fredericksburg, VA US 22408

Contact: WILLIAM MILO wmilo@gflenv.com

To discuss this sample report, contact Customer Service at 1-800-237-1369. * - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

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

T:

F: