

OIL ANALYSIS REPORT

(FAN292) 424076

Component **Diesel Engine**

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

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

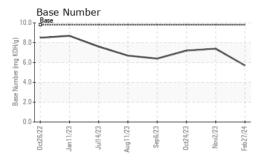
Fluid Condition

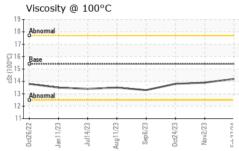
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| Sample Number Client Info GFL0089603 GFL0083073 GFL0097211 Sample Date Client Info 27 Feb 2024 02 Nov 2023 24 Oct 2023 Action Age hrs Client Info 0 0 0 0 0 0 0 0 0 | CAMPLE INCOR | | 002022 0 | an2023 Jul2023 Aug20 | | Feb2024 | 12.1 |
|--|------------------|----------|-------------|----------------------|-------------|-------------|-------------|
| Sample Date | SAMPLE INFOR | MATION | method | limit/base | current | history1 | history2 |
| Machine Age hrs Client Info 0 0 0 0 0 0 0 0 0 | Sample Number | | Client Info | | GFL0089603 | GFL0083073 | GFL0097211 |
| Oil Age hrs Client Info Not Changd N | Sample Date | | Client Info | | 27 Feb 2024 | 02 Nov 2023 | 24 Oct 2023 |
| Oil Changed Client Info Not Changd NORMAL NEG | Machine Age | hrs | Client Info | | 0 | 0 | 0 |
| NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2 history2 history2 history2 history2 history2 history2 NEG NE | Oil Age | hrs | Client Info | | 0 | 0 | 0 |
| Fuel | Oil Changed | | Client Info | | Not Changd | Not Changd | Not Changd |
| Fuel | Sample Status | | | | NORMAL | NORMAL | NORMAL |
| Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imitibase current history1 history2 WEAR METALS method limitibase current history1 history2 Iron ppm ASTM D5185m >165 60 45 48 Chromium ppm ASTM D5185m >5 3 2 2 Nickel ppm ASTM D5185m >4 0 0 0 Silver ppm ASTM D5185m >2 <1 | 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 |
| Irron | Glycol | | WC Method | | NEG | NEG | NEG |
| Chromium ppm ASTM D5185m >5 3 2 2 Nickel ppm ASTM D5185m >4 0 0 0 Titanium ppm ASTM D5185m >2 <1 1 1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 3 11 7 Lead ppm ASTM D5185m >20 3 11 7 Lead ppm ASTM D5185m >90 58 59 60 Copper ppm ASTM D5185m >90 58 59 60 Tin ppm ASTM D5185m >5 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 | WEAR METAL | _S | method | limit/base | current | history1 | history2 |
| Nickel | Iron | ppm | ASTM D5185m | >165 | 60 | 45 | 48 |
| Titanium | Chromium | ppm | ASTM D5185m | >5 | 3 | 2 | 2 |
| Titanium | Nickel | ppm | ASTM D5185m | >4 | 0 | 0 | 0 |
| Aluminum ppm ASTM D5185m >20 3 11 7 Lead ppm ASTM D5185m >150 12 6 6 Copper ppm ASTM D5185m >90 58 59 60 Tin ppm ASTM D5185m >5 <1 | Titanium | ppm | ASTM D5185m | >2 | <1 | 1 | 1 |
| Lead | Silver | | ASTM D5185m | >2 | 0 | 0 | 0 |
| Lead | Aluminum | ppm | ASTM D5185m | >20 | 3 | 11 | 7 |
| Tin | Lead | ppm | ASTM D5185m | >150 | 12 | 6 | 6 |
| Tin | Copper | ppm | ASTM D5185m | >90 | 58 | 59 | 60 |
| Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 13 8 7 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 66 63 63 Manganese ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 | | | | | | | |
| Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 13 8 7 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 66 63 63 Manganese ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1070 1134 1217 1155 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Solicon ppm ASTM D5185m >35 | Vanadium | | ASTM D5185m | | | | 0 |
| Boron | Cadmium | | | | | | 0 |
| Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 66 63 63 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/ba | ADDITIVES | | method | limit/base | current | history1 | history2 |
| Molybdenum ppm ASTM D5185m 60 66 63 63 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 >7.5 | Boron | ppm | ASTM D5185m | 0 | 13 | 8 | 7 |
| Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 | Barium | ppm | ASTM D5185m | 0 | 0 | 0 | 0 |
| Magnesium ppm ASTM D5185m 1010 920 882 871 Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >35 10 8 46 Potassium ppm ASTM D5185m >20 <1 | Molybdenum | ppm | ASTM D5185m | 60 | 66 | 63 | 63 |
| Calcium ppm ASTM D5185m 1070 1122 1047 1064 Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >35 10 8 46 Potassium ppm ASTM D5185m >20 <1 | Manganese | ppm | ASTM D5185m | 0 | <1 | <1 | <1 |
| Phosphorus ppm ASTM D5185m 1150 957 897 1018 Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m >35 10 8 46 Potassium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.3 1.5 1.5 Nitration Abs/cm *ASTM D7624 >20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 >30 29.2 24.1 24.4 FLUID DEGRADATION *ASTM D | Magnesium | ppm | ASTM D5185m | 1010 | 920 | 882 | 871 |
| Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m 10 8 46 Potassium ppm ASTM D5185m >20 <1 | Calcium | ppm | ASTM D5185m | 1070 | 1122 | 1047 | 1064 |
| Zinc ppm ASTM D5185m 1270 1134 1217 1155 Sulfur ppm ASTM D5185m 2060 2194 2313 2221 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m 10 8 46 Potassium ppm ASTM D5185m >20 <1 | Phosphorus | ppm | ASTM D5185m | 1150 | 957 | 897 | 1018 |
| CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m 10 8 46 Potassium ppm ASTM D5185m >20 <1 | Zinc | ppm | ASTM D5185m | 1270 | 1134 | 1217 | 1155 |
| Silicon ppm ASTM D5185m >35 10 19 17 Sodium ppm ASTM D5185m 10 8 46 Potassium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.3 1.5 1.5 Nitration Abs/cm *ASTM D7624 >20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 >30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Sulfur | ppm | ASTM D5185m | 2060 | 2194 | 2313 | 2221 |
| Sodium ppm ASTM D5185m 10 8 46 Potassium ppm ASTM D5185m >20 <1 | CONTAMINAN | NTS | method | limit/base | current | history1 | history2 |
| Potassium ppm ASTM D5185m >20 <1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.3 1.5 1.5 Nitration Abs/cm *ASTM D7624 >20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 >30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Silicon | ppm | ASTM D5185m | >35 | 10 | 19 | 17 |
| INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.3 1.5 1.5 Nitration Abs/cm *ASTM D7624 >20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 >30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Sodium | ppm | ASTM D5185m | | 10 | 8 | 46 |
| Soot % % *ASTM D7844 > 7.5 2.3 1.5 1.5 Nitration Abs/cm *ASTM D7624 > 20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 > 30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 27.5 20.2 20.8 | Potassium | ppm | ASTM D5185m | >20 | <1 | 0 | 2 |
| Nitration Abs/cm *ASTM D7624 > 20 16.3 12.8 12.6 Sulfation Abs/.1mm *ASTM D7415 > 30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 27.5 20.2 20.8 | INFRA-RED | | method | limit/base | current | history1 | history2 |
| Sulfation Abs/.1mm *ASTM D7415 >30 29.2 24.1 24.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Soot % | % | *ASTM D7844 | >7.5 | 2.3 | 1.5 | 1.5 |
| FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Nitration | Abs/cm | *ASTM D7624 | >20 | 16.3 | 12.8 | 12.6 |
| Oxidation Abs/.1mm *ASTM D7414 >25 27.5 20.2 20.8 | Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 29.2 | 24.1 | 24.4 |
| | FLUID DEGRA | DATION | method | limit/base | current | history1 | history2 |
| Base Number (BN) mg KOH/g ASTM D2896 9.8 5.7 7.4 7.2 | Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 27.5 | 20.2 | 20.8 |
| | Base Number (BN) | mg KOH/g | ASTM D2896 | 9.8 | 5.7 | 7.4 | 7.2 |



OIL ANALYSIS REPORT



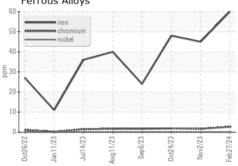


| VISUAL | | method | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Precipitate |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

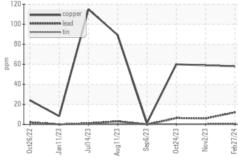
| FLUID PROPE | ERTIES | method | | | | history2 |
|--------------|--------|-----------|------|------|------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 15.4 | 14.2 | 13.9 | 13.8 |

GRAPHS

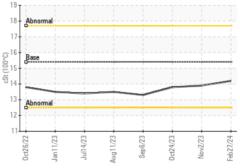
Ferrous Alloys











(mg K0H/g) 0.0 Jan11/23

Base Number





Certificate L2367

Laboratory Sample No.

Test Package : FLEET

: GFL0089603 Lab Number : 06111056 Unique Number: 10914553

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 07 Mar 2024 Tested

: 07 Mar 2024 : 09 Mar 2024 - Don Baldridge Diagnosed

GFL Environmental - 072 - Americus - Transwaste

361 McMath Mill Road Americus, GA

US 31719 Contact: RICHARD HEINZERLING

richard.heinzerling@gflenv.com

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

T: (229)924-3669

* - 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)