

OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id 413001

Component Diesel Engine

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

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

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

| SAMPLE INFORI | MATION | method | limit/base | current | history1 | history2 |
|---|---|---|---|--|--|--|
| Sample Number | | Client Info | | GFL0093526 | GFL0077263 | GFL0060576 |
| Sample Date | | Client Info | | 06 Sep 2023 | 10 Apr 2023 | 23 Mar 2023 |
| Machine Age | hrs | Client Info | | 2439 | 1383 | 1266 |
| Oil Age | hrs | Client Info | | 559 | 133 | 565 |
| Oil Changed | | Client Info | | Changed | Not Changd | Changed |
| Sample Status | | | | NORMAL | NORMAL | ATTENTION |
| CONTAMINAT | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <1.0 | <1.0 | <1.0 |
| Glycol | | WC Method | | NEG | NEG | NEG |
| WEAR METAL | S | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >100 | 10 | 7 | 11 |
| Chromium | ppm | ASTM D5185m | >20 | 1 | 0 | 1 |
| Nickel | ppm | ASTM D5185m | >4 | <1 | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | 2 | <1 | 83 |
| Silver | ppm | ASTM D5185m | >3 | - <1 | 0 | 3 |
| Aluminum | ppm | ASTM D5185m | >20 | 5 | 2 | 3 |
| Lead | ppm | ASTM D5185m | >40 | 1 | 0 | <1 |
| Copper | ppm | ASTM D5185m | >330 | 13 | 33 | 10 |
| Tin | ppm | ASTM D5185m | >15 | 3 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | 210 | 0 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| Caumum | ppm | AGTIM D3103III | | S1 | 0 | 0 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| Boron | ppm | ASTM D5185m | 0 | <1 | 6 | 83 |
| Boron Barium | ppm ppm | ASTM D5185m ASTM D5185m | 0 | <1 44 | 6 0 | 83 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | <1 44 56 | 6 0 59 | 83 0 5 |
| Boron Barium Molybdenum Manganese | ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | <1 44 56 1 | 6 0 59 <1 | 83 0 5 1 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 | <1 44 56 1 898 | 6 0 59 <1 880 | 83 0 5 1 456 |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | <1 44 56 1 898 978 | 6 0 59 <1 880 1066 | 83 0 5 1 456 1896 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 | <1 44 56 1 898 | 6 0 59 <1 880 | 83 0 5 1 456 |
| 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 | <1 44 56 1 898 978 | 6 0 59 <1 880 1066 | 83 0 5 1 456 1896 |
| 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 | 0 0 60 0 1010 1070 1150 | <1 44 56 1 898 978 907 | 6 0 59 <1 880 1066 936 | 83 0 5 1 456 1896 997 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm 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 | <1 44 56 1 898 978 907 1153 | 6 0 59 <1 880 1066 936 1158 | 83 0 5 1 456 1896 997 1194 |
| 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 | 0 0 60 0 1010 1070 1150 1270 2060 | <1 44 56 1 898 978 907 1153 2927 | 6 0 59 <1 880 1066 936 1158 3088 | 83 0 5 1 456 1896 997 1194 4045 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 1010 1070 1150 1270 2060 | <1 44 56 1 898 978 907 1153 2927 current | 6 0 59 <1 880 1066 936 1158 3088 history1 | 83 0 5 1 456 1896 997 1194 4045 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon | 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 ASTM D5185m | 0 0 60 1010 1070 1150 1270 2060 | <1 44 56 1 898 978 907 1153 2927 current 8 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 | 83 0 5 1 456 1896 997 1194 4045 history2 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 ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 Limit/base >25 | <1 44 56 1 898 978 907 1153 2927 current 8 4 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 limit/base >25 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 current | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 4 history1 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >20 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 current 0.3 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 4 history1 0.1 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 history2 0.4 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium 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 <i>limit/base</i> >25 >20 <i>limit/base</i> >3 >20 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 current 0.3 7.5 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 4 history1 0.1 5.7 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 history2 0.4 11.9 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium 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 20 225 20 20 3 20 3 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 current 0.3 7.5 19.3 | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 4 history1 0.1 5.7 18.4 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 history2 0.4 11.9 24.2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 220 20 20 30 20 30 20 30 20 20 20 20 20 20 20 20 20 20 20 20 20 | <1 44 56 1 898 978 907 1153 2927 current 8 4 15 current 0.3 7.5 19.3 current | 6 0 59 <1 880 1066 936 1158 3088 history1 9 2 4 4 history1 0.1 5.7 18.4 history1 | 83 0 5 1 456 1896 997 1194 4045 history2 8 0 3 history2 0.4 11.9 24.2 history2 |



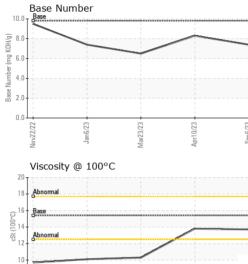
8

Ś

Nov22/22

Jan6/23

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 | |
| Mar23/23 | Apr1 0/23 - Sep6/23 - | Appearance | scalar | *Visual | NORML | NORML | NORML | NORML | |
| Mar2 | Apr1 Sep | 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 | RTIES | method | limit/base | current | history1 | history2 | |
| | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 13.7 | 13.8 | ▲ 10.3 | |
| | | GRAPHS | | | | | | | |
| | | Ferrous Alloys | | | | | | | |
| /23 | /23 | 30 - iron | | | | | | | |
| Mar23/23 | Apr10/23 | 25 - nickel | | | | | | | |
| | | | | | | | | | |
| | | E 15 | | | | | | | |
| | | | | | | | | | |
| | | 10- | | | | | | | |
| | | 5 - | | | | | | | |
| | | 23 52 | 23 | 53 | 3111111 | | | | |
| | | Jan6,23 | Mar23/23 | Apr10/23 | Sep6/23 | | | | |
| | | N , | _ | A | 05 | | | | |
| | | Non-ferrous Meta | ls | | | | | | |
| | | copper | | | | | | | |
| | | 200 - tin | | | | | | | |
| | | 150 | | | | | | | |
| | | md la | | | | | | | |
| | | 100 | | | | | | | |
| | | | \mathbf{N} | | | | | | |
| | | 50 - | | | | | | | |
| | | | | | | | | | |
| | | Vov22/22 Jan6/23 | lar23/23 | Apr10/23 | Sep6/23 | | | | |
| | | Novi | Mari | Apr | Sel | | | | |
| | | Viscosity @ 100°C | | | | Base Number | | | |
| | | 20 | | | 10.0 | | 1 | | |
| | | 18 - Abnormal | | | 8.0· | | | | |
| | | 16 Base | | | KOH/ | | \sim | | |
| | | (3.00 (1) (2.00 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) | | | B 6.0 | | | | |
| | | | 1 | | .a 5 4.0 | | | | |
| | | 12- | / | | 0.04 6.04 8888 Number (mg KOH(0) 4.0- | | | | |
| | | 10- | _ | | ⁶⁶ 2.0· | | | | |
| | | 8 | | | 0.0- | | | | |
| | | ov22/22 - | 3/23 | 0/23 | Sep6/23 | lov22/22 - Jan6/23 - | 3/23 | 4pr10/23 - | |
| | | Nov22/22 Jan6/23 | Mar23/23 | Apr10/23 | Sep | Nov22/22 Jan6/23 | Mar23/23 | Apr10/23 | |
| | l | : WearCheck USA - 5 | | | ry, NC 27513 Sep 2023 | 3 1001 South Rockwe | | | |
| | Laboratory Sample No. Lab Number Unique Numbe Test Package | : 05952506 r : 10648465 | Received Diagnos Diagnosi | ed : 18 \$ | Sep 2023 Sep 2023 s Davis | | Ok | lahoma City, O US 7312 | |

Contact/Location: Andy Smith - GFL891