

OIL ANALYSIS REPORT

Sample Rating Trend



Area (BD49688) Machine Id 914021 Component Diesel Engine Fluid

PETRO CANADA DURON SHP 15W40 (9 GAL)

SAMPLE INFORMATION method

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

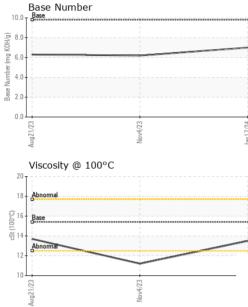
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| | | method | 11111/0430 | | matory | |
|--|--|--|--|---|--|---|
| Sample Number | | Client Info | | GFL0106658 | GFL0097664 | GFL0087296 |
| Sample Date | | Client Info | | 17 Jan 2024 | 04 Nov 2023 | 21 Aug 2023 |
| Machine Age | hrs | Client Info | | 1768 | 1152 | 608 |
| Oil Age | hrs | Client Info | | 616 | 550 | 608 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | ABNORMAL | NORMAL |
| | | | | | | |
| CONTAMINATI | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >3.0 | <1.0 | 0.5 | <1.0 |
| Water | | WC Method | >0.2 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| WEAR METALS | c | method | limit/base | current | history1 | history2 |
| | 0 | | | | | |
| Iron | ppm | ASTM D5185m | >120 | 12 | 41 | 41 |
| Chromium | ppm | ASTM D5185m | >20 | <1 | 1 | 1 |
| Nickel | ppm | ASTM D5185m | >5 | 2 | 3 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | 0 | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 1 | 3 | 4 |
| Lead | ppm | ASTM D5185m | >40 | <1 | <1 | 0 |
| Copper | ppm | ASTM D5185m | >330 | 15 | 71 | 2 |
| Tin | ppm | ASTM D5185m | >15 | <1 | 3 | 0 |
| Vanadium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| ADDITIVES | | ام م الم معا | limit/bass | | la la tanan d | history2 |
| | | method | | | | riistoryz |
| Boron | maa | ASTM D5185m | 0 | | 47 | |
| | ppm ppm | ASTM D5185m | 0 | 3 0 | | <1 0 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 0 | 3 0 | 47 0 | <1 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | 3 0 55 | 47 0 93 | <1 0 68 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | 3 0 55 <1 | 47 0 93 4 | <1 0 68 1 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 | 3 0 55 <1 922 | 47 0 93 4 737 | <1 0 68 1 1011 |
| 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 | 3 0 55 <1 922 1056 | 47 0 93 4 737 1306 | <1 0 68 1 1011 1179 |
| 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 | 3 0 55 <1 922 1056 980 | 47 0 93 4 737 1306 728 | <1 0 68 1 1011 1179 1094 |
| 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 | 3 0 55 <1 922 1056 980 1195 | 47 0 93 4 737 1306 728 947 | <1 0 68 1 1011 1179 1094 1363 |
| 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 | 3 0 55 <1 922 1056 980 1195 2854 | 47 0 93 4 737 1306 728 947 2042 | <1 0 68 1 1011 1179 1094 1363 3553 |
| 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 | 3 0 55 <1 922 1056 980 1195 | 47 0 93 4 737 1306 728 947 | <1 0 68 1 1011 1179 1094 1363 |
| 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 | 3 0 55 <1 922 1056 980 1195 2854 | 47 0 93 4 737 1306 728 947 2042 | <1 0 68 1 1011 1179 1094 1363 3553 |
| 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 ASTM D5185m | 0 0 60 1010 1070 1150 1270 2060 | 3 0 555 <1 922 1056 980 1195 2854 current | 47 0 93 4 737 1306 728 947 2042 history1 | <1 0 68 1 1011 1179 1094 1363 3553 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 method | 0 0 60 1010 1070 1150 1270 2060 | 3 0 555 <1 922 1056 980 1195 2854 2854 current 5 | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 |
| 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 ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 limit/base | 3 0 55 <1 922 1056 980 1195 2854 current 5 2 | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 4 |
| 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 | 3 0 55 <1 922 1056 980 1195 2854 current 5 2 2 2 2 | 47 0 93 4 737 1306 728 947 2042 bistory1 ▲ 35 6 4 4 history1 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 4 4 <1 |
| 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 | 3 0 55 <1 922 1056 980 1195 2854 <i>current</i> 5 2 2 2 2 <i>current</i> 0.4 | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 4 4 history1 0.7 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 4 <1 kistory2 0.7 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium 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 225 >25 | 3 0 55 <1 922 1056 980 1195 2854 current 5 2 2 2 2 current | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 4 35 6 4 4 0.7 11.2 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 4 <1 5 4 <1 history2 0.7 9.2 |
| 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 ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 20 20 20 20 20 20 20 20 20 20 20 20 | 3 0 55 <1 922 1056 980 1195 2854 <u>current</u> 5 2 2 2 2 <u>current</u> 0.4 8.3 19.7 | 47 0 93 4 737 1306 728 947 2042 history1 35 6 4 35 6 4 history1 0.7 11.2 23.9 | <1 0 68 1 1011 1179 1094 1363 3553 history2 5 4 <1 5 4 <1 history2 0.7 9.2 20.8 |
| 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 TS ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 220 20 20 20 20 20 20 20 20 20 20 20 | 3 0 55 <1 922 1056 980 1195 2854 <i>current</i> 5 2 2 2 2 <i>current</i> 0.4 8.3 19.7 <i>current</i> | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 4 4 history1 0.7 11.2 23.9 history1 | <1 0 68 1 1011 1011 1179 1094 1363 3553 history2 5 4 <1 history2 0.7 9.2 20.8 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE Oxidation | ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm ppm ppm pp | ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7414 | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 imit/base >20 imit/base >20 | 3 0 55 <1 922 1056 980 1195 2854 <i>current</i> 5 2 2 2 2 <i>current</i> 0.4 8.3 19.7 <i>current</i> 15.9 | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 4 4 history1 0.7 11.2 23.9 history1 | <1 0 68 1 1011 1011 1179 1094 1363 3553 history2 5 4 <1 history2 0.7 9.2 20.8 history2 17.0 |
| 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 TS ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 220 20 20 20 20 20 20 20 20 20 20 20 | 3 0 55 <1 922 1056 980 1195 2854 <i>current</i> 5 2 2 2 2 <i>current</i> 0.4 8.3 19.7 <i>current</i> | 47 0 93 4 737 1306 728 947 2042 history1 ▲ 35 6 4 4 history1 0.7 11.2 23.9 history1 | <1 0 68 1 1011 1011 1179 1094 1363 3553 history2 5 4 <1 history2 0.7 9.2 20.8 history2 |



OIL ANALYSIS REPORT

VISUAL



| | | Yellow Metal Precipitate | | | NONE NONE | NONE NONE | NONE | NONE NONE |
|----------------------|---|---|------------------------|-------------------------|--------------------------|--------------|-------------------|--|
| | | Silt | | | NONE | NONE | NONE | NONE |
| | | Debris | | | NONE | NONE | NONE | NONE |
| | | Sand/Dirt | | | NONE | NONE | NONE | NONE |
| Nov4/23 | Jan17/24 - | Appearance | | | NORML | NORML | NORML | NORML |
| Nov | Jan1 | Odor | | *Visual | NORML | NORML | NORML | NORML |
| | | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| | | Free Water | scalar | *Visual | | NEG | NEG | NEG |
| | | FLUID PROP | | method | limit/base | current | history1 | history2 |
| | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 13.5 | ▲ 11.2 | 13.7 |
| | | GRAPHS Ferrous Alloys | | | | | | |
| | | 45 T | | | | | | |
| Nov4/23 | | 40 - Iron 35 - nickel | | | | | | |
| N | | 30 | | | | | | |
| | | Ē ²⁵ 20 | | | | | | |
| | | 1 C C C C C C C C C C C C C C C C C C C | | | | | | |
| | | 15 | | | | | | |
| | | 5 - | | | | | | |
| | | 0 | | | 4 | | | |
| | | Aug21/23 | Nov4/23 | | Jan 17/24 | | | |
| | | | | | - P | | | |
| | | Non-ferrous Met | als | | | | | |
| | | 70 - copper | ~ | | | | | |
| | | 60 | $/ \setminus$ | | | | | |
| | | 50- | | | | | | |
| | | 툍 40 | | | | | | |
| | | 30 | | | | | | |
| | | 20 | | | | | | |
| | | 10 | | | | | | |
| | | | /23 | | /24 | | | |
| | | Aug21/23 | Nov4/23 | | Jan 17/24 | | | |
| | | Viscosity @ 100° | с | | | Paco Numb | or | |
| | | ¹⁹ | | | 10.0 | Base Numb | er | |
| | | 18 - Abnormal 17 - | | | | | | |
| | | 16 | | | (^B /HC | | | |
| | | | | | (b)/HOX Bul) taquum 4.0- | | | |
| | | ()-015- 15- 14- | | | | | | |
| | | 13 Abnormal | | | N.U. | | | |
| | | 12 | \checkmark | | £2.0 | | | |
| | | 11 | | | 0.0 | | | |
| | | Aug21/23 | Nov4/23 - | | Jan 17/24 | Aug21/23 - | Nov4/23 - | |
| | | Aug2 | Nov | | Jan1 | Aug2 | Nov | |
| | | : WearCheck USA - | 501 Madia | | / NC 27512 | | Environmental - 4 | 05 - Arbor Hi |
| , | Laboratory | . Wear UTIECK USA - | | | y, NC 27513 an 2024 | GFL | | |
| | Laboratory Sample No. | | Recieved | | | | | 7400 Nacier r |
| | Sample No. Lab Number | : GFL0106658 : <mark>06066604</mark> | Recieved Diagnose | d : 22 Ja | an 2024 | | | ORTHVILLE, I |
| | Sample No. Lab Number Unique Number | : GFL0106658 <mark>: 06066604</mark> : 10843281 | | d : 22 Ja | an 2024 | | NC | 7400 Napier F DRTHVILLE, I US 4810 |
| Inclassificate L2367 | Sample No. Lab Number Unique Number Test Package | : GFL0106658 : <mark>06066604</mark> | Diagnose Diagnostic | d : 22 Ja cian : Wes | an 2024 | | NC Contact: A | ORTHVILLE, I |

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