

OIL ANALYSIS REPORT

Sample Rating Trend NORMAL



Component **1 Diesel Engine** Fluid

{UNASSIGNED}

711047

PETRO CANADA DURON SHP 15W40 (7 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.

| | | methou | iiiiii/base | current | nistory i | nistoryz |
|---|--|--|---|---|---|--|
| Sample Number | | Client Info | | GFL0097689 | GFL0087313 | GFL0087332 |
| Sample Date | | Client Info | | 29 Nov 2023 | 27 Sep 2023 | 12 Jul 2023 |
| Machine Age | hrs | Client Info | | 5818 | 5284 | 4575 |
| Oil Age | hrs | Client Info | | 534 | 709 | 625 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| | | ام و وال و ور | | | - | histow.0 |
| CONTAMINAT | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >3.0 | <1.0 | <1.0 | <1.0 |
| Water | | WC Method | >0.2 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| WEAR METAL | S | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >75 | 28 | 77 | 36 |
| Chromium | ppm | ASTM D5185m | | 2 | 3 | 2 |
| Nickel | ppm | ASTM D5185m | >4 | - <1 | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | <1 | 0 | <1 |
| Silver | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | | 17 | 39 | 29 |
| Lead | ppm | | >25 | <1 | <1 | 1 |
| Copper | ppm | ASTM D5185m | | 2 | 4 | 3 |
| Tin | ppm | | >4 | 2 <1 | + <1 | <1 |
| Vanadium | ppm | ASTM D5185m | 21 | <1 | <1 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| ADDITIVES | ррпп | | | | | - |
| | | | | | | |
| | | method | limit/base | current | history1 | history2 |
| Boron | ppm | ASTM D5185m | 0 | 2 | 27 | 55 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 0 | 2 0 | 27 0 | 55 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | 2 0 59 | 27 0 62 | 55 0 59 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | 2 0 59 <1 | 27 0 62 <1 | 55 0 59 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 | 2 0 59 <1 908 | 27 0 62 <1 433 | 55 0 59 1 392 |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 1070 | 2 0 59 <1 908 1120 | 27 0 62 <1 433 1653 | 55 0 59 1 392 1783 |
| 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 | 2 0 59 <1 908 1120 1021 | 27 0 62 <1 433 1653 953 | 55 0 59 1 392 1783 981 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | 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 | 2 0 59 <1 908 1120 1021 1262 | 27 0 62 <1 433 1653 953 1230 | 55 0 59 1 392 1783 981 1237 |
| 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 | 2 0 59 <1 908 1120 1021 | 27 0 62 <1 433 1653 953 | 55 0 59 1 392 1783 981 |
| 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 | 2 0 59 <1 908 1120 1021 1262 | 27 0 62 <1 433 1653 953 1230 | 55 0 59 1 392 1783 981 1237 |
| 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 | 2 0 59 <1 908 1120 1021 1262 2796 | 27 0 62 <1 433 1653 953 1230 2991 | 55 0 59 1 392 1783 981 1237 3615 |
| 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 0 1010 1070 1150 1270 2060 | 2 0 59 <1 908 1120 1021 1262 2796 current | 27 0 62 <1 433 1653 953 1230 2991 history1 | 55 0 59 1 392 1783 981 1237 3615 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 0 1010 1070 1150 1270 2060 | 2 0 59 <1 908 1120 1021 1262 2796 current 5 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 | 55 0 59 1 392 1783 981 1237 3615 history2 6 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium | 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 ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 kimit/base >25 | 2 0 59 <1 908 1120 1021 1262 2796 current 5 5 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 imit/base >25 | 2 0 59 <1 908 1120 1021 1262 2796 current 5 5 38 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 >25 | 2 0 59 <1 908 1120 1021 1262 2796 current 5 5 38 28 current | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 history1 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >20 | 2 0 59 <1 908 1120 1021 1262 2796 current 5 5 38 current 0.5 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 history1 0.8 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 history2 0.5 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration | ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 >20 imit/base >20 imit/base >20 | 2 0 59 <1 908 1120 1021 1262 2796 <i>current</i> 5 5 5 38 <i>current</i> 0.5 9.6 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 history1 0.8 11.4 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 6 3 62 history2 0.5 9.8 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAC | ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm Abs/cm Abs/cm | ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415 | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 220 220 20 20 20 20 20 20 20 20 20 2 | 2 0 59 <1 908 1120 1021 1262 2796 Current 5 5 38 Current 0.5 9.6 19.4 Current | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 history1 0.8 11.4 25.0 history1 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 history2 0.5 9.8 21.5 history2 |
| 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 | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 imit/base >25 imit/base >6 >20 | 2 0 59 <1 908 1120 1021 1262 2796 <u>current</u> 5 5 38 <u>current</u> 0.5 9.6 19.4 | 27 0 62 <1 433 1653 953 1230 2991 history1 5 7 106 history1 0.8 11.4 25.0 | 55 0 59 1 392 1783 981 1237 3615 history2 6 3 62 history2 0.5 9.8 21.5 |

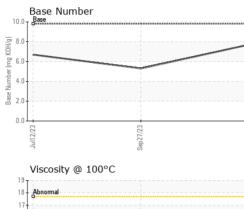


() 10.00 15. 14. Base

13 Abnormal 12 11

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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 |
| Sep 27/23 | Appearance | scalar | *Visual | NORML | NORML | NORML | NORML |
| Sep | Odor | scalar | *Visual | NORML | NORML | NORML | NORML |
| 2 | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| | Free Water | scalar | *Visual | | NEG | NEG | NEG |
| | FLUID PROPI | ERTIES | method | limit/base | current | history1 | history2 |
| | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 13.3 | 13.3 | 13.2 |
| | GRAPHS | | | | | | |
| | Ferrous Alloys | | | | | | |
| //23 | 70 - iron | \wedge | | | | | |
| Sep 27/23 | 60 - nickel | | | | | | |
| | 50 | | | | | | |
| | E 40 | | | | | | |
| | 30 - | | | | | | |
| | 20 | | | | | | |
| | | | | | | | |
| | | /23 - | | /23 | | | |
| | Jul12/23 | Sep27/23 | | Nov29/23 | | | |
| | Non-ferrous Meta | | | 2 | | | |
| | ¹⁰ T | | | | | | |
| | 8 - copper | | | | | | |
| | tin | | | | | | |
| | 6- | | | | | | |
| | u dd | | | | | | |
| | | | | | | | |
| | 2- | | | | | | |
| | | Lanse | | | | | |
| | o 1112/23 | 7/23 - | | 9/23 - | | | |
| | Jult | Sep 27/23 | | Nov29/23 | | | |
| | Viscosity @ 100° | C | | | Base Number | | |
| | 19 | | | 10.0 | Base | | |
| | 18 - Abnormal | | | | | | |
| | 17 | | | (B/HO | | | |
| | G16 Base 15 15 14 | | | Ĕ 6.0 | | | |
| | | | | | | | |
| | S 14 | | | 0.6 Base Number (mg KOH/g) | I | | |
| | 12 | | | 100 | 1 | | |
| | 13 - Abnormal | | | ² 2.0 | 1 | | |
| | 12 | | | 2.0 | | | |
| | 13 - Abnormal 12 | 7/23 | | 2.0 | | 7/23 | c E |
| | 13 - Abnormal | Sep21/23 | | 2.0 | Juli 2/23 | Sep 27/23 | |
| | 13 - Abnormal 12 11 - EXC | | | 0.0 | Juli 2/23 | | |
| Laboratory Sample No. | : WearCheck USA - | 501 Madi | | ry, NC 27513 | Juli 2/23 | rironmental - 4 | 05 - Arbor Hill |
| Laboratory Sample No. Lab Number | 13 - Abnormal 12 11 - EXC | | d : 06 l | 0.0 | Juli 2/23 | rironmental - 40 7 | |
| Sample No. Lab Number Unique Number | : WearCheck USA - : GFL0097689 : 06025985 : 10775776 | 501 Madia | d : 06 l ed : 07 l | ry, NC 27513 Dec 2023 | GFL Env | r ironmental - 4 1 7 NC | 0 5 - Arbor Hill 7400 Napier R 0RTHVILLE, M US 4816 |
| Sample No. Lab Number Unique Number Test Package | : WearCheck USA - : GFL0097689 : 06025985 : 10775776 : FLEET | 501 Madia Received Diagnos Diagnost | d : 06 I ed : 07 I tician : Jon | ry, NC 27513 Dec 2023 Dec 2023 athan Hester | GFL Env | r ironmental - 4 0 7 NC Contact: Ar | 0 5 - Arbor Hill 7400 Napier R 0RTHVILLE, M US 4816 nthony Hopkin |
| Sample No. Lab Number Unique Number | : WearCheck USA - : GFL0097689 : 06025985 : 10775776 : FLEET contact Customer Ser | 501 Madia Received Diagnos Diagnost | d : 06 l ed : 07 l tician : Jon 800-237-1369 | ry, NC 27513 Dec 2023 Dec 2023 athan Hester | GFL Env | r ironmental - 4 0 7 NC Contact: Ar | 0 5 - Arbor Hil 7400 Napier F 0RTHVILLE, N US 4816 |

Submitted By: John Nahal Page 2 of 2