

OIL ANALYSIS REPORT

Sample Rating Trend





Component

Diesel Engine

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.

| | | Νον2ο22 Feb2o23 Μω2ο23 Μω2ο23 Αυφ2ο23 Sep2o23 Οκε2ο23 Οκε2ο23 Οκε2ο23 | | | | | | | |
|---|---|--|---|--|--|--|--|--|--|
| SAMPLE INFORM | MATION | method | limit/base | current | history1 | history2 | | | |
| Sample Number | | Client Info | | GFL0098465 | GFL0098480 | GFL0083696 | | | |
| Sample Date | | Client Info | | 31 Oct 2023 | 17 Oct 2023 | 02 Oct 2023 | | | |
| Machine Age | hrs | Client Info | | 0 | 150 | 9655 | | | |
| Oil Age | hrs | Client Info | | 600 | 600 | 9655 | | | |
| Oil Changed | | Client Info | | Changed | Not Changd | Not Changd | | | |
| Sample Status | | | | NORMAL | NORMAL | NORMAL | | | |
| 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 | >110 | 10 | 8 | 59 | | | |
| Chromium | ppm | ASTM D5185m | >4 | <1 | <1 | 2 | | | |
| Nickel | ppm | ASTM D5185m | >2 | 0 | <1 | <1 | | | |
| Titanium | ppm | ASTM D5185m | | 0 | <1 | 0 | | | |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | <1 | | | |
| Aluminum | ppm | ASTM D5185m | >25 | 2 | 2 | 8 | | | |
| Lead | ppm | ASTM D5185m | >45 | <1 | <1 | 11 | | | |
| Copper | ppm | ASTM D5185m | >85 | 0 | <1 | 2 | | | |
| Tin | ppm | ASTM D5185m | >4 | <1 | 1 | 1 | | | |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | 0 | | | |
| Cadmium | ppm | ASTM D5185m | | 0 | <1 | 0 | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 | | | |
| Boron | nom | ASTM D5185m | 0 | 4 | <1 | 4 | | | |
| | ppm | ASTIVI DOTODITI | 0 | | < 1 | 4 | | | |
| Barium | ppm | ASTM D5185m | | 0 | 0 | 0 | | | |
| | | | | | | | | | |
| Molybdenum | ppm | ASTM D5185m | 0 60 | 0 | 0 | 0 | | | |
| Molybdenum Manganese | ppm ppm | ASTM D5185m ASTM D5185m | 0 60 | 0 57 | 0 50 | 0 60 | | | |
| Molybdenum Manganese Magnesium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 60 0 | 0 57 <1 | 0 50 <1 | 0 60 1 | | | |
| Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 60 0 1010 | 0 57 <1 888 | 0 50 <1 887 | 0 60 1 924 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 | 0 57 <1 888 1144 | 0 50 <1 887 1060 | 0 60 1 924 1227 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 1150 | 0 57 <1 888 1144 1019 | 0 50 <1 887 1060 903 | 0 60 1 924 1227 1078 | | | |
| 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 | 0 60 0 1010 1070 1150 1270 | 0 57 <1 888 1144 1019 1224 | 0 50 <1 887 1060 903 1190 | 0 60 1 924 1227 1078 1318 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 1150 1270 2060 | 0 57 <1 888 1144 1019 1224 3033 | 0 50 <1 887 1060 903 1190 2906 | 0 60 1 924 1227 1078 1318 2864 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon | 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 60 0 1010 1070 1150 1270 2060 | 0 57 <1 888 1144 1019 1224 3033 current | 0 50 <1 887 1060 903 1190 2906 history1 | 0 60 1 924 1227 1078 1318 2864 history2 | | | |
| 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 | 0 60 0 1010 1070 1150 1270 2060 Iimit/base >30 | 0 57 <1 888 1144 1019 1224 3033 current 4 | 0 50 <1 887 1060 903 1190 2906 history1 4 | 0 60 1 924 1227 1078 1318 2864 history2 7 | | | |
| 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 | 0 60 0 1010 1070 1150 1270 2060 Iimit/base >30 | 0 57 <1 888 1144 1019 1224 3033 current 4 3 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 | | | |
| 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 60 0 1010 1070 1150 1270 2060 limit/base >30 | 0 57 <1 888 1144 1019 1224 3033 current 4 3 2 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 4 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 8 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 1150 1270 2060 <i>limit/base</i> >20 <i>limit/base</i> >3 | 0 57 <1 888 1144 1019 1224 3033 current 4 3 2 2 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 4 history1 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 8 8 | | | |
| Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration | ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 1150 1270 2060 limit/base >30 >20 limit/base >3 >20 | 0 57 <1 888 1144 1019 1224 3033 current 4 3 2 2 current 0.2 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 4 3 4 history1 0.2 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 8 8 history2 0.6 | | | |
| 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 60 0 1010 1070 1150 1270 2060 limit/base >30 >20 limit/base >3 >20 | 0 57 <1 888 1144 1019 1224 3033 <u>current</u> 4 3 2 2 <u>current</u> 0.2 7.2 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 4 history1 0.2 5.8 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 8 <i>history2</i> 0.6 10.9 | | | |
| Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 60 0 1010 1070 1150 1270 2060 imit/base >30 20 imit/base >3 20 >3 30 | 0 57 <1 888 1144 1019 1224 3033 current 4 3 2 current 0.2 7.2 19.5 | 0 50 <1 887 1060 903 1190 2906 history1 4 3 4 3 4 0.2 5.8 17.8 | 0 60 1 924 1227 1078 1318 2864 history2 7 7 7 8 history2 0.6 10.9 22.9 | | | |

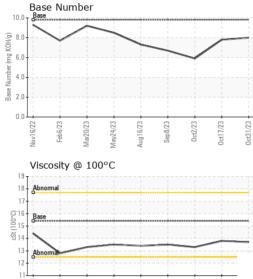


Feb6/23

Mar20/23

Nov16/22

OIL ANALYSIS REPORT



| | | VISUAL | | method | limit/base | current | | 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 |
| May24/23 Aug16/23 Sep8/23 | 0ct2/23 0ct17/23 | Appearance | scalar | *Visual | NORML | NORML | NORML | NORML |
| May Aug Se | 0 20 20 | Cuci | scalar | *Visual | NORML | NORML | NORML | NORML |
| С | | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| | | Free Water | scalar | *Visual | | NEG | NEG | NEG |
| | | FLUID PROPE | | method | limit/base | current | history1 | history2 |
| | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 13.7 | 13.8 | 13.3 |
| | | GRAPHS | | | | | | |
| | | Ferrous Alloys | | | | | | |
| 23 23 23 23 23 23 23 23 23 - 23 | 23 | iron | | | | | | |
| May24/23 Aug16/23 Sep8/23 | 0ct2/23 0ct17/23 | 50 - nickel | | | | | | |
| 2 4 | - | | | | | | | |
| | | ₫ ₃₀ | | | | | | |
| | | 20 | | | | | | |
| | | 10 | | | | | | |
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| | | | ug16/23 - Sen8/23 | | 0ct31/23 | | | |
| | | Nov16/22 Feb6/23 Mar20/23 | Aug16/23 Sen8/23 | Oct1 Oct | 0ct3 | | | |
| | | Non-ferrous Meta | ls | | | | | |
| | | 12 copper | | 4 | | | | |
| | | 10 - management lead | | Λ | | | | |
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| | | | 23- | 23 | 23 | | | |
| | | Nov16/22 Feb6/23 Mar20/23 | Aug16/23 Sen8/23 | 0ct2/23 0ct17/23 | 0ct31/23 | | | |
| | | Viscosity @ 100°C | | - | | | | |
| | | ¹⁹ | | | 10.0 | Base Number | | |
| | | 18 - Abnormal | | | | $\backslash \land$ | _ | |
| | | 17 | | | (B/H) | \sim | | |
| | | ⊖ ¹⁶ Base | | | 9 6.0 2 6.0 | | | \checkmark |
| | | 3-16 Base 15 15 14 | | | mber (| | | |
| | | | | | 6.0 Base Number (mg KOH/g) | | | |
| | | 13 Abnorma | | | 2.0 | | | |
| | | 12 | | | | | | |
| | | 12 | | | | | | |
| | | 11 | 16/23 | ct2/23 | | /16/22 - b6/23 - 20/23 - | /24/23 16/23 p8/23 | ct2/23 - 117/23 - 31/23 - |
| | | Nov16/22 | Aug16/23 | 0ct2/230ct2/23 | 0ct31/23 | Nov16/22 - Feb6/23 - Mar20/23 - | May24/23 Aug16/23 Sep8/23 | 0ct2/23 + 0ct17/23 + |
| J | Laboratorv | Niov16,/22 Feb6,/23 + Mar/24,/23 + | | 0 | 0ct31/23 | 2 2 | 2 4 | 0 0 |
| ANAB | Laboratory Sample No. | : WearCheck USA - 5 : GFL0098465 | 501 Madis Received | on Ave., Ca | ry, NC 27513 Nov 2023 | 2 2 | ronmental - 846 - | Mayfield Hauling State Route 45 |
| | Sample No. Lab Number | : WearCheck USA - 5 : GFL0098465 : 05998653 | 501 Madis Received Diagnose | on Ave., Ca I : 06 I ed : 06 I | ry, NC 27513 Nov 2023 Nov 2023 | 2 2 | ronmental - 846 - | Mayfield Hauling State Route 45 Mayfield, KY |
| | Sample No. Lab Number Unique Numbe | : WearCheck USA - 5 : GFL0098465 : 05998653 r : 10727013 | 501 Madis Received | on Ave., Ca I : 06 I ed : 06 I | ry, NC 27513 Nov 2023 | 2 2 | conmental - 846 - 3426 | Mayfield Hauling State Route 45 Mayfield, KY US 42066 |
| Certificate L2367 To discuss this | Sample No. Lab Number Unique Numbe Test Package | : WearCheck USA - 5 : GFL0098465 : 05998653 r : 10727013 | 501 Madis Received Diagnose Diagnost | con Ave., Ca I : 06 I ed : 06 I ician : We | ry, NC 27513 Nov 2023 Nov 2023 Sov 2023 S Davis | 2 2 | ronmental - 846 - 3426 Contac | Mayfield Hauling State Route 45 Mayfield, KY |