

OIL ANALYSIS REPORT

Sample Rating Trend

DEGRADATION



Component

Diesel Engine

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

DIAGNOSIS

Recommendation

The oil is near the end of it's useful service life, recommend schedule an oil change. 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 level is low. The condition of the oil is acceptable for the time in service.

| AL) | | Jun2023 | Jun2023 | Sep2023 Dec2023 | Feb2024 | |
|---|--|--|--|---|--|---|
| SAMPLE INFORM | MATION | method | limit/base | current | history1 | history2 |
| Sample Number | | Client Info | | GFL0106845 | GFL0092114 | GFL0084665 |
| Sample Date | | Client Info | | 09 Feb 2024 | 05 Dec 2023 | 28 Sep 2023 |
| Machine Age | hrs | Client Info | | 2392 | 1828 | 15030 |
| Oil Age | hrs | Client Info | | 600 | 600 | 0 |
| Oil Changed | | Client Info | | N/A | Changed | Changed |
| Sample Status | | | | ABNORMAL | NORMAL | NORMAL |
| CONTAMINAT | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <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 |
| ron | ppm | ASTM D5185m | >100 | 13 | 23 | 16 |
| Chromium | ppm | ASTM D5185m | >20 | 1 | 2 | 1 |
| Nickel | ppm | ASTM D5185m | >4 | <1 | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Silver | ppm | ASTM D5185m | >3 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 20 | 56 | 16 |
| Lead | ppm | ASTM D5185m | >40 | <1 | 0 | 1 |
| Copper | ppm | ASTM D5185m | >330 | <1 | 2 | 4 |
| Γin | ppm | ASTM D5185m | >15 | <1 | <1 | 1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| Boron | ppm | ASTM D5185m | 0 | 8 | 8 | 5 |
| Barium | ppm | ASTM D5185m | 0 | 0 | 0 | 0 |
| Volybdenum | ppm | ASTM D5185m | 60 | 56 | 60 | 57 |
| Manganese | ppm | ASTM D5185m | 0 | <1 | <1 | 2 |
| Magnesium | ppm | ASTM D5185m | 1010 | 573 | 608 | 634 |
| Calcium | ppm | ASTM D5185m | 1070 | 1623 | 1710 | 1683 |
| Phosphorus | ppm | ASTM D5185m | 1150 | 737 | 721 | 701 |
| Zinc | ppm | ASTM D5185m | 1270 | 1001 | 1050 | 989 |
| Sulfur | ppm | ASTM D5185m | 2060 | 2524 | 2560 | 2456 |
| | | and a discount | 11 1. 1 | | | |
| CONTAMINAN | TS | method | limit/base | current | history1 | history2 |
| | TS ppm | ASTM D5185m | limit/base | current 7 | history1 9 | history2 9 |
| Silicon | | | | | | |
| Silicon Sodium | ppm | ASTM D5185m | | 7 | 9 | 9 |
| Silicon Sodium | ppm ppm | ASTM D5185m ASTM D5185m | >25 | 7 7 67 | 9 9 | 9 |
| Silicon Sodium Potassium INFRA-RED | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | >25 >20 | 7 7 67 | 9 9 178 | 9 8 63 |
| Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m method | >25 >20 limit/base | 7 7 67 current | 9 9 178 history1 | 9 8 63 history2 |
| Silicon Sodium Potassium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 | >25 >20 limit/base >3 | 7 7 67 current 0 | 9 9 178 history1 0 | 9 8 63 history2 0 |
| Silicon Sodium Potassium INFRA-RED Soot % Nitration | ppm ppm ppm % Abs/cm Abs/.1mm | ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7624 *ASTM D7415 | >25 >20 limit/base >3 >20 | 7 7 67 <u>current</u> 0 11.4 23.1 | 9 9 178 history1 0 11.3 | 9 8 63 history2 0 11.1 |
| Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm % Abs/cm Abs/.1mm | ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7624 *ASTM D7415 | >25 >20 limit/base >3 >20 >30 | 7 7 67 <u>current</u> 0 11.4 23.1 | 9 9 178 history1 0 11.3 23.9 | 9 8 63 history2 0 11.1 23.2 |

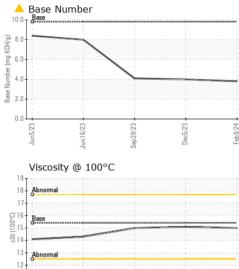


11

Jun16/23

OIL ANALYSIS REPORT

VISUAL



| | | 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 |
| Sep28/23 | Dec5/23 Feb9/24 | Appearance | scalar | *Visual | NORML | NORML | NORML | NORML |
| Sep 2 | Feb | Odor | scalar | *Visual | NORML | NORML | NORML | NORML |
| | | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| | 1 1 | Free Water | scalar | *Visual | | NEG | NEG | NEG |
| | | FLUID PROPE | RTIES | method | limit/base | current | history1 | history2 |
| | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 15.0 | 15.1 | 15.0 |
| | | GRAPHS | | | | | | |
| | | Ferrous Alloys | | | | | | |
| 23 | 23 | iron | | | | | | |
| Sep 28/23 | Dec5/23 съса <i>та</i> | 25 - chromium | | ~ | | | | |
| õ | | 20 | \backslash | $< \setminus$ | | | | |
| | | 틆 15- | \checkmark | | | | | |
| | | 10- | | | | | | |
| | | 10 | | | | | | |
| | | 5 - | | and and an and a state of the s | | | | |
| | | | | | ALL DECEMBER OF | | | |
| | | Jun5/23 Jun 16/23 | Sep 28/23 | Dec5/23 | Feb9/24 | | | |
| | | | | Ó | ιζ. | | | |
| | | Non-ferrous Meta | ls | | | | | |
| | | copper | | | | | | |
| | | 12 - Lead | | | | | | |
| | | 10 | | 1 | | | | |
| | | E 8 | | | | | | |
| | | ^C 6- | \mathbf{i} | | | | | |
| | | 4 | 1 | | | | | |
| | | 2 | | | | | | |
| | | | | No. of Concession, Name of | | | | |
| | | | 8 | 23 | 27 | | | |
| | | n5/23 . | 28/ | SC5 | /6 qi | | | |
| | | Jun5/23 - | Sep 28/23 | Dec5/23 | Feb 9/24 | | | |
| | | Viscosity @ 100° | | Dec5. | | Base Number | | |
| | | Viscosity @ 100°(| | Dec5 | | Base Number | | |
| | | Viscosity @ 100° | | Dec5 | 10.0 | Base Number | | |
| | | Viscosity @ 100°(| | Dec5 | 10.0 | Base Number | | |
| | | Viscosity @ 100°(| | Decs | 10.0 | Base Number | | |
| | | Viscosity @ 100°(| | Decs | 10.0 | Base Number | | |
| | | Viscosity @ 100°0 | | Deci | 10.0 | Base Number | | |
| | | Viscosity @ 100°0 | | Dech | 10.0 8.0 WHOY Buy ga | Base Number | | |
| | | Viscosity @ 100°(| | De55 | 10.0 (6)HOX (0)HOX (0) (6.0 Mum assess 4.0 2.0 | Base Number | | |
| | | Viscosity @ 100°0 | | | 10.0- (0) HOX Du HOX DU | Base | 3/3 | 5/3 |
| | | Viscosity @ 100°(| | Dec5/23 Dec5 | 10.0 (6)HOX (0)HOX (0) (6.0 Mum assess 4.0 2.0 | Base Number | Sep28/23 | Dec5/23 |
| | | Viscosity @ 100% | C | Dec5/23 - | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Jun 16/23 | | |
| 4 | Laboratory | Viscosity @ 100°C | C ECUIDAN ECUIDAN D1 Madiso | n Ave., Cary | 10.0- 10 | Jun 16/23 | ronmental - 856 | - Houston Sout |
| | Sample No. | Viscosity @ 100°0 | C ECUIDAD | n Ave., Cary ved : 13 | 10.0- 10 | Jun 16/23 | ronmental - 856 | - Houston Sout ighway 6 Sout |
| | Sample No. Lab Number | Viscosity @ 100°0 | C ECCENT | n Ave., Cary ved : 13 d : 14 | NC 27513 Feb 2024 | GFL Envi | ronmental - 856 | - Houston Sout ighway 6 Sout Houston, T |
| | Sample No. Lab Number Unique Number | Viscosity @ 100°0 Viscosity @ 100°0 Abnormal Abnormal Control 10 Base Control 10 Control 10 Co | C ECUIDAD | n Ave., Cary ved : 13 d : 14 | 10.0- 10 | GFL Envi | ronmental - 856 8515 H | - Houston Sou t ighway 6 Sout Houston, T US 7708 |
| ertificate L2367 | Sample No. Lab Number Unique Number Test Package | Viscosity @ 100°0 Viscosity @ 100°0 Abnormal Abnormal Control 10 Base Control 10 Control 10 Co | C EXERCISE DI Madiso Recei Teste Diagn | n Ave., Cary ved :13 d :14 iosed :15 | NC 27513 Feb 2024 Feb 2024 - Don | GFL Envi | ronmental - 856 8515 H Contact: Ap | - Houston Sou t ighway 6 Sout Houston, T |

limit/base

current

method

history1

history2