

OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id 412042

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.

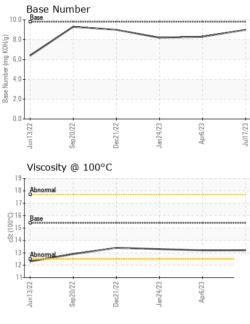
Fluid Condition

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 | | GFL0077501 | GFL0068194 | GFL0060746 |
| Sample Date | | Client Info | | 17 Jul 2023 | 06 Apr 2023 | 24 Jan 2023 |
| Machine Age | hrs | Client Info | | 4178 | 3589 | 3239 |
| Oil Age | hrs | Client Info | | 589 | 350 | 726 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| CONTAMINAT | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >2.0 | <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 | 13 | 8 | 16 |
| Chromium | ppm | ASTM D5185m | >20 | <1 | <1 | 1 |
| Nickel | ppm | ASTM D5185m | >4 | <1 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| Silver | ppm | ASTM D5185m | >3 | 0 | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | 3 | 0 | 3 |
| Lead | ppm | ASTM D5185m | >40 | <1 | <1 | <1 |
| Copper | ppm | ASTM D5185m | >330 | <1 | <1 | <1 |
| Tin | ppm | ASTM D5185m | >15 | <1 | <1 | 1 |
| Vanadium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base | current 2 | history1 3 | history2 5 |
| | ppm ppm | | 0 | | | |
| Boron | | ASTM D5185m | 0 | 2 | 3 | 5 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 0 0 60 | 2 0 | 3 2 | 5 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | 2 0 63 | 3 2 58 | 5 0 64 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | 2 0 63 <1 | 3 2 58 <1 | 5 0 64 <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 63 <1 1014 | 3 2 58 <1 915 | 5 0 64 <1 910 |
| 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 | 2 0 63 <1 1014 1155 | 3 2 58 <1 915 1078 | 5 0 64 <1 910 1096 |
| 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 1010 1070 1150 | 2 0 63 <1 1014 1155 1033 | 3 2 58 <1 915 1078 1011 | 5 0 64 <1 910 1096 973 |
| 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 63 <1 1014 1155 1033 1301 | 3 2 58 <1 915 1078 1011 1215 | 5 0 64 <1 910 1096 973 1192 |
| 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 63 <1 1014 1155 1033 1301 3736 | 3 2 58 <1 915 1078 1011 1215 2898 | 5 0 64 <1 910 1096 973 1192 3469 |
| 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 | 2 0 63 <1 1014 1155 1033 1301 3736 current | 3 2 58 <1 915 1078 1011 1215 2898 history1 | 5 0 64 <1 910 1096 973 1192 3469 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 imit/base >25 | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 |
| 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 1010 1070 1150 1270 2060 imit/base >25 | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 3 3 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 |
| 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 0 1010 1070 1150 1270 2060 imit/base >25 | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 3 3 3 3 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 |
| 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 imit/base >25 -20 | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 3 3 3 3 Current | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 3 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 history2 |
| 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 | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 Imit/base >25 >20 Imit/base >3 | 2 0 63 <1 1014 1155 1033 1301 3736 <u>current</u> 3 3 3 3 <u>current</u> 0.4 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 history1 0.2 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 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 | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 3 3 3 current 0.4 8.1 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 history1 0.2 6.2 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 history2 0.4 8.2 |
| 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 imit/base >25 imit/base >3 >20 >30 | 2 0 63 <1 1014 1155 1033 1301 3736 <u>current</u> 3 3 3 3 <u>3</u> <u>current</u> 0.4 8.1 19.5 | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 3 history1 0.2 6.2 17.7 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 <u>history2</u> 0.4 8.2 18.8 |
| 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 ppm TS ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 | 0 0 0 1010 1070 1150 2260 225 220 220 imit/base >3 >20 >30 imit/base | 2 0 63 <1 1014 1155 1033 1301 3736 current 3 3 3 3 current 0.4 8.1 19.5 current | 3 2 58 <1 915 1078 1011 1215 2898 history1 3 3 3 3 history1 0.2 6.2 17.7 history1 | 5 0 64 <1 910 1096 973 1192 3469 history2 4 3 6 history2 0.4 8.2 18.8 history2 |



OIL ANALYSIS REPORT



| | | VISUAL | | method | | | | 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 |
| Dec21/22 Jan24/23 | Apr6/23 - | Appearance | scalar | *Visual | NORML | NORML | NORML | NORML |
| Jan | Ar | Odor | scalar | *Visual | NORML | NORML | NORML | NORML |
| | | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| | | Free Water | scalar | *Visual | | NEG | NEG | NEG |
| | | FLUID PROPI | | method | limit/base | current | history1 | history2 |
| | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 13.2 | 13.2 | 13.3 |
| | | GRAPHS | | | | | | |
| | | Ferrous Alloys | | | | | | |
| 23 | 23 | iron | | | | | | |
| Dec21/22 Jan24/23 | Apr6/23 | 50 - nickel | | | | | | |
| | | 40 | | | | | | |
| | | <u> 특</u> 30 | | | | | | |
| | | 20 | | | | | | |
| | | | | | | | | |
| | | 10 | | | | | | |
| | | | 23 | | 53 | | | |
| | | Jun 13/22 Sep 20/22 | Dec21/22 Jan24/23 | Apr6/23 | Jul17/23 | | | |
| | | ⊸ ∽ Non-ferrous Meta | | | , | | | |
| | | ¹⁰ T | | | | | | |
| | | copper | | | | | | |
| | | DESI ARABARARAR | | | | | | |
| | | 8 - energy tin | | | | | | |
| | | 6 | | | | | | |
| | | | | | | | | |
| | | 6 | | | | | | |
| | | 6 | | | | | | |
| | | | | | | | | |
| | | | 22 | 23 | 23 | | | |
| | | | 0ec21/22 + | Apr6/23 | Jul17/23 | | | |
| | | udd 2 0 2202 deg | . , | Apr6/23 | Juli 7/23 | | | |
| | | | . , | Apr6/23 | - | Base Number | | |
| | | Viscosity @ 100° | . , | Apr6/23 | EZ/LIIPr 10.0 | | | |
| | | Viscosity @ 100° | . , | Apr6/23 | 10.0 | Base | | |
| | | Viscosity @ 100° | . , | Apr6/23 | 10.0 | Base | | |
| | | Viscosity @ 100° | . , | Aphiliza | 10.0 | Base | | |
| | | Viscosity @ 100° | . , | Apt6/23 | 10.0 | Base | | |
| | | Viscosity @ 100° Abnomal Abnomal Abnomal Abnomal | . , | Apr6/23 | 0.0 8.0 KOH(Q) 0.0 0.0 0.0 0.0 | Base | | |
| | | Viscosity @ 100° | . , | Apf6/23 | 10.0 (0)HOX BUL PQUID BUL PQUID BUL PQUID BUL PQUID BUL BUL BUL BUL BUL BUL BUL BUL BUL BUL | Base | | |
| | | Viscosity @ 100° Abnomal 17 18 4 4 2 0 220 220 200 200 200 2 | C | | 10.0 (0)HOX Bul HOX BU | Base | | 23 |
| | | Viscosity @ 100° Abnomal 17 18 4 4 2 0 220 220 200 200 200 2 | C | | 10.0 (0)HOX Bul HOX BU | Base | | Apr6/23 |
| | | Viscosity @ 100° Abnomal 17 16 Base 12 11 10 10 10 10 10 10 10 10 10 | . , | | 10.0 (0)HOX BUL PQUID BUL PQUID BUL PQUID BUL PQUID BUL BUL BUL BUL BUL BUL BUL BUL BUL BUL | Base | Dec21/22 | Apr6/23 |
| | Laboratory | Viscosity @ 100° Viscosity @ 100° Control of the second | C C 501 Madia | ECIGURY Son Ave., Ca | 10.0 (0HO) 6.0 bu) Jaquin 4.0 cc/Lling cc/Lling rry, NC 27513 | Jun 13/22 Sep 20/22 | Dec2/1/23 7au/24/1/3 ironmental - 625 - | Harrison Hauling |
| | Sample No. | Viscosity @ 100° Viscosity @ 100° Control of the second | C C 501 Madia Received | son Ave., Ca | 10.0 (PHO) Bull Bull 2023 | Jun 13/22 Sep 20/22 | Dec2/1/23 7au/24/1/3 ironmental - 625 - | Harrison Hauling |
| | Sample No. Lab Number | Viscosity @ 100° Viscosity @ 100° Viscosity @ 100° Control of the second sec | C C 501 Madia Received Diagnos | son Ave., Ca d : 18 . ed : 19 . | 10.0 (PHO) Bull Solution (PHO) Bull Solution (| Jun 13/22 Sep 20/22 | Dec2/1/23 7au/24/1/3 ironmental - 625 - | Harrison Hauling Industrial Pkwy Harrison, M |
| | Sample No. Lab Number Unique Number | Viscosity @ 100° Viscosity @ 100° Viscosity @ 100° | C C 501 Madia Received | son Ave., Ca d : 18 . ed : 19 . | 10.0 (PHO) Bull Bull 2023 | Jun 13/22 Sep 20/22 | 27/12040 EZ/12040 ironmental - 625 - 4102 | Harrison Hauling Industrial Pkwy Harrison, M US 48625 |
| Certificate L2367 o discuss thi | Sample No. Lab Number Unique Number Test Package | Viscosity @ 100° Viscosity @ 100° Viscosity @ 100° | C C 501 Madia Received Diagnos Diagnos | son Ave., Ca d : 18 , ed : 19 , tician : We | 10.0 (PHO) Bull 30 (PHO) Bull 30 (PHO) Bull 30 (PHO) Bull 30 (PHO) Bull 4.0 (PHO) Bull 4.0 (PHO) Bull 4.0 (PHO) Bull 4.0 (PHO) Bull 4.0 (PHO) Bull 30 (PHO) | Jun 13/22 Sep 20/22 | 27/12390 EZ/1/2390 ironmental - 625 - 4102 Contact: 0 | Harrison Hauling Industrial Pkwy Harrison, M |

1

Ĕ.

цуй

Submitted By: also GFL632 and GFL638 - Glenda Standen