

OIL ANALYSIS REPORT

Sample Rating Trend





Diesel Engine

PETRO CANADA DURON SHP 10W30 (--- QTS)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

Wear

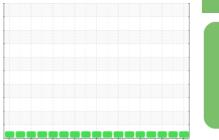
All component wear rates are normal.

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.



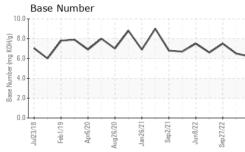


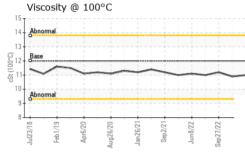
[u]2018 Feb2019 Apr/020 Apr/020 Lisn/021 Sen/0211 μ...2022 Sen/020 Apr/020 A

| SAMPLE INFOR | MATION | method | limit/base | current | history1 | history2 |
|---|--|---|--|--|--|---|
| Sample Number | | Client Info | | PCA0102839 | PCA0093666 | PCA0080210 |
| Sample Date | | Client Info | | 05 Sep 2023 | 30 Mar 2023 | 27 Sep 2022 |
| Machine Age | mls | Client Info | | 585789 | 545991 | 500920 |
| Oil Age | mls | Client Info | | 39798 | 45071 | 62077 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| CONTAMINAT | | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <1.0 | <1.0 | <1.0 |
| Glycol | | WC Method | >0 | <1.0 NEG | <1.0 NEG | <1.0 NEG |
| - | | WC Welliou | | NEG | NEG | NEG |
| WEAR METAL | S | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >100 | 14 | 23 | 6 |
| Chromium | ppm | ASTM D5185m | >20 | <1 | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | 0 | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Silver | ppm | ASTM D5185m | >3 | <1 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 2 | 4 | 2 |
| Lead | ppm | ASTM D5185m | >40 | <1 | 2 | 2 |
| Copper | ppm | ASTM D5185m | >330 | 4 | 6 | 3 |
| Tin | ppm | ASTM D5185m | >15 | <1 | <1 | 0 |
| Vanadium | ppm | ASTM D5185m | | 0 | 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 3 | history1 0 | history2 0 |
| | ppm ppm | | | | | |
| Boron | | ASTM D5185m | 2 | 3 | 0 | 0 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 2 0 50 | 3 0 | 0 | 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 2 0 50 | 3 0 56 | 0 0 59 | 0 0 60 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 2 0 50 0 | 3 0 56 <1 | 0 0 59 <1 | 0 0 60 <1 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 2 0 50 0 950 | 3 0 56 <1 985 | 0 0 59 <1 897 | 0 0 60 <1 927 |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 2 0 50 0 950 1050 | 3 0 56 <1 985 1082 | 0 0 59 <1 897 1084 | 0 0 60 <1 927 1074 |
| 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 ASTM D5185m | 2 0 50 0 950 1050 995 | 3 0 56 <1 985 1082 976 | 0 0 59 <1 897 1084 943 | 0 0 60 <1 927 1074 964 |
| 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 | 2 0 50 0 950 1050 995 1180 | 3 0 56 <1 985 1082 976 1250 | 0 0 59 <1 897 1084 943 1188 | 0 0 60 <1 927 1074 964 1206 |
| 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 ASTM D5185m | 2 0 50 0 950 1050 995 1180 2600 limit/base | 3 0 56 <1 985 1082 976 1250 3205 | 0 0 59 <1 897 1084 943 1188 2818 | 0 0 60 <1 927 1074 964 1206 3196 |
| 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 | 2 0 50 0 950 1050 995 1180 2600 limit/base | 3 0 56 <1 985 1082 976 1250 3205 current | 0 0 59 <1 897 1084 943 1188 2818 history1 | 0 0 60 <1 927 1074 964 1206 3196 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 ASTM D5185m | 2 0 50 0 950 1050 995 1180 2600 limit/base >25 | 3 0 56 <1 985 1082 976 1250 3205 current 4 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 | 0 0 60 <1 927 1074 964 1206 3196 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 method ASTM D5185m | 2 0 50 0 950 1050 995 1180 2600 limit/base >25 | 3 0 56 <1 985 1082 976 1250 3205 <u>current</u> 4 11 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 |
| 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 | 2 0 50 950 1050 995 1180 2600 limit/base >25 >20 limit/base | 3 0 56 <1 985 1082 976 1250 3205 current 4 11 3 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 |
| 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 | 2 0 50 950 1050 995 1180 2600 limit/base >25 >20 limit/base >3 | 3 0 56 <1 985 1082 976 1250 3205 current 4 11 3 current | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 3 history1 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 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 | 2 0 50 950 1050 995 1180 2600 limit/base >25 >20 limit/base >3 | 3 0 56 <1 985 1082 976 1250 3205 <u>current</u> 4 11 3 <u>current</u> 0.4 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 13 3 history1 0.6 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 5 <1 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 ppm ppm ppm | ASTM D5185m ASTM D5185m | 2 0 50 0 950 1050 995 1180 2600 <i>limit/base</i> >25 >20 <i>limit/base</i> >3 >20 | 3 0 56 <1 985 1082 976 1250 3205 <i>current</i> 4 11 3 <i>current</i> 0.4 9.5 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 history1 0.6 9.7 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 5 <1 history2 0.5 9.7 |
| 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 | ASTM D5185m ASTM D7844 *ASTM D7844 | 2 0 50 0 950 1050 995 1180 2600 imit/base >25 .20 imit/base >3 >20 .30 imit/base | 3 0 56 <1 985 1082 976 1250 3205 current 4 11 3 current 0.4 9.5 21.9 current | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 history1 0.6 9.7 22.0 history1 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 history2 0.5 9.7 23.4 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 ppm ppm ppm | ASTM D5185m ASTM D5185m | 2 0 50 0 950 1050 995 1180 2600 imit/base >25 .20 imit/base >3 >20 .30 imit/base | 3 0 56 <1 985 1082 976 1250 3205 <u>current</u> 4 11 3 <u>current</u> 0.4 9.5 21.9 | 0 0 59 <1 897 1084 943 1188 2818 history1 8 13 3 history1 0.6 9.7 22.0 | 0 0 60 <1 927 1074 964 1206 3196 history2 4 15 <1 <1 history2 0.5 9.7 23.4 |

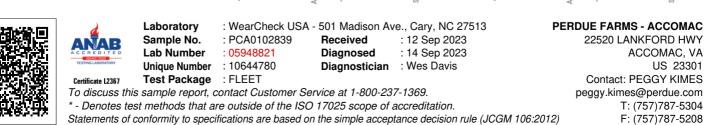


OIL ANALYSIS REPORT





| White Metal scalar Visual NONE NONE NONE NONE NONE NONE NONE NON | VISUAL | | method | limit/base | current | history1 | history |
|---|---|-----------|------------|--|---------------------|----------|---------|
| Precipitate scalar Visual NONE NONE NONE NONE NONE NONE NONE NON | White Metal | scalar | *Visual | NONE | | NONE | NONE |
| Silt scalar 'Visual NONE NONE NONE NONE NONE NONE NONE Scalar 'Visual NONE NONE NONE NONE NONE NONE NONE NON | | | | | | | |
| Debris scalar *Visual NONE NONE NONE NONE NONE Appearance scalar *Visual NORML NORML NORML NORML NORML NORML Odor scalar *Visual NORML NORML NORML NORML NORML NORML NORML Emulsified Water scalar *Visual >0.2 NEG NEG NEG NEG NEG Scalar *Visual NORML NOR | | | | | | | |
| Sand/Dirt scalar *Visual NONE NONE NONE NORML NO | | | | | | | |
| Appearance scalar *Visual NORML NORML NORML NORML NORM Odor scalar *Visual >0.2 NEG NEG NEG Free Water scalar *Visual >0.2 NEG NEG NEG Free Water scalar *Visual >0.2 NEG NEG NEG Free Water scalar *Visual >0.2 NEG NEG NEG FLUID PROPERTIES method imit/base current history1 histor FLUID PROPERTIES method imit/base current history1 histor GRAPHS Ferrous Alloys 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | | | | | | |
| Odor scalar Visual NORML | | | | | | | |
| Emulsified Water scalar Visual >0.2 NEG | | | | | | | |
| Free Water scalar *Visual NEG NEG NEG FLUID PROPERTIES method limit/base current history1 history1 Visc @ 100°C cSt ASTM D445 12.00 11.0 10.9 11.2 GRAPHS Ferrous Alloys On-ferrous Metals Open for the start of t | | | | | | | |
| Visc @ 100°C cSt ASTM D445 12.00 11.0 10.9 11.2 GRAPHS Ferrous Alloys Non-ferrous Metals Viscosity @ 100°C | | | | 20.2 | | | |
| Ferrous Alloys | FLUID PROPER | RTIES | method | limit/base | current | history1 | history |
| Ferrous Alloys | Visc @ 100°C | cSt | ASTM D445 | 12.00 | 11.0 | 10.9 | 11.2 |
| Ferrous Alloys | GRAPHS | | | | | | |
| Non-ferrous Metals Viscosity @ 100°C Viscosity @ 100°C | | | | | | | |
| Provide a second state of the second state of | 0 23333384550000000000000000000000000000000 | Jan 26/21 | | Sep5/23 | | | |
| Bircond Bircon | Non-ferrous Metals | | | Sep5.223 | | | |
| Viscosity @ 100°C Base Number Base Aumoral Abnormal Abnormal Abnormal | Non-ferrous Metals | | | Sep5/23 | | | |
| Abnormal Abnorm | Non-ferrous Metals | | 121/12/ge8 | | | | |
| Base Abnormal A | Non-ferrous Metals | | 121/12/ge8 | | Base Number | | |
| 9 | Non-ferrous Metals | | 121/12/ge8 | Sep5/23 | | | |
| 9 | Non-ferrous Metals | | 121/12/ge8 | 200 200 200 200 200 200 200 200 200 200 |) | | |
| 9 | Non-ferrous Metals | | 121/12/ge8 | 200 200 200 200 200 200 200 200 200 200 | $\langle \ \rangle$ | ~~_ | |
| 9 | Non-ferrous Metals | | 121/12/ge8 | 200 200 200 200 200 200 200 200 200 200 | $\langle \ \rangle$ | \sim | ~~~ |
| 9 8 8 0.0 | Non-ferrous Metals | | 121/12/ge8 | 200 200 200 200 200 200 200 200 200 200 | \checkmark | ~~_ | ~~~ |
| 23 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 1 | Non-ferrous Metals | | 121/12/ge8 | 10.0 Seb2/23 see Mumber (mg KOH(d) 4.0 | \checkmark | | ~~~ |
| | Non-ferrous Metals | | 121/12/ge8 | 10.0 (b)(HO)X Bul) aquiny Bul) | | ~~~ | ~~~ |



Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Submitted By: RANDY PARKER

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