

OIL ANALYSIS REPORT

KEMP QUARRIES / PRYOR STONE [66676]





NORMAL

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

Fluid

OHT078 Component Diesel Engine

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: Pm3 performed. All oil samples taken. Engine oil, and all filters changed.)

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

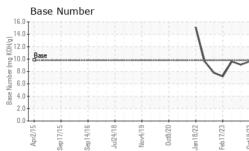
Fluid Condition

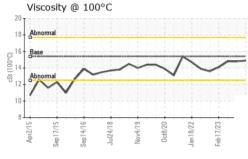
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

| SAMPLE INFOR | MATION | method | limit/base | current | history1 | history2 |
|---|--|---|--|---|--|---|
| Sample Number | | Client Info | | PCA0086242 | PCA0084242 | PCA0084000 |
| Sample Date | | Client Info | | 19 Oct 2023 | 11 Aug 2023 | 22 May 2023 |
| Machine Age | hrs | Client Info | | 34627 | 34182 | 33716 |
| Oil Age | hrs | Client Info | | 445 | 466 | 576 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| 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 | >100 | 27 | 34 | 34 |
| Chromium | ppm | ASTM D5185m | | <1 | <1 | 0 |
| Nickel | ppm | ASTM D5185m | >2 | <1 | 1 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | <1 | 0 | 0 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | | <1 | 3 | 7 |
| Lead | ppm | ASTM D5185m | >40 | <1 | 0 | 0 |
| Copper | ppm | ASTM D5185m | | 2 | 3 | 4 |
| Tin | ppm | ASTM D5185m | >15 | - <1 | <1 | 0 |
| Vanadium | ppm | ASTM D5185m | , 10 | 0 | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| ADDITIVES | | ine ette e el | l: | | In the transmission | histow 0 |
| | | method | iimii/base | current | nistory i | riistorvz |
| | maa | method ASTM D5185m | limit/base | current | history1 6 | history2 2 |
| Boron | ppm | ASTM D5185m | 0 | 0 | 6 | 2 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 0 | 0 0 | 6 0 | 2 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | 0 0 63 | 6 0 69 | 2 0 68 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | 0 0 63 <1 | 6 0 69 <1 | 2 0 68 0 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 | 0 0 63 <1 990 | 6 0 69 <1 1057 | 2 0 68 0 1117 |
| 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 | 0 0 63 <1 990 1084 | 6 0 69 <1 1057 1200 | 2 0 68 0 1117 1283 |
| 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 | 0 0 63 <1 990 1084 1071 | 6 0 69 <1 1057 1200 1147 | 2 0 68 0 1117 1283 1154 |
| 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 | 0 0 63 <1 990 1084 | 6 0 69 <1 1057 1200 | 2 0 68 0 1117 1283 |
| 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 | 0 0 63 <1 990 1084 1071 1354 | 6 0 69 <1 1057 1200 1147 1406 | 2 0 68 0 1117 1283 1154 1494 |
| 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 1010 1070 1150 1270 2060 limit/base | 0 0 63 <1 990 1084 1071 1354 3150 | 6 0 69 <1 1057 1200 1147 1406 3929 | 2 0 68 0 1117 1283 1154 1494 3984 |
| Boron Barium 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 method | 0 0 60 1010 1070 1150 1270 2060 limit/base | 0 0 63 <1 990 1084 1071 1354 3150 current 3 | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 | 2 0 68 0 1117 1283 1154 1494 3984 history2 |
| 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 0 1010 1070 1150 1270 2060 limit/base >25 | 0 0 63 <1 990 1084 1071 1354 3150 current | 6 0 69 <1 1057 1200 1147 1406 3929 history1 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium | ppm 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 limit/base >25 | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 3 | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 1 2 current | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 1 1 current 1.3 | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 history1 1.4 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 history2 1.2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 imit/base >25 20 imit/base >3 >20 | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 1 2 current | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 0 history1 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 0 history2 |
| 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 imit/base >25 20 imit/base >3 >20 | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 1 2 1 2 1.3 9.7 | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 history1 1.4 1.4 10.3 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 bistory2 1.2 1.2 11.4 |
| 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 D7844 *ASTM D7624 | 0 0 0 1010 1070 1150 1270 2060 imit/base >25 imit/base >20 imit/base >3 >20 >30 | 0 0 63 <1 990 1084 1071 1354 3150 current 3 3 3 1 current 1.3 9.7 22.0 current | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 history1 1.4 10.3 22.3 history1 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 history2 1.2 1.2 11.4 23.1 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 | 0 0 0 1010 1070 1150 1270 2060 imit/base >25 imit/base >30 >30 imit/base | 0 0 63 <1 990 1084 1071 1354 3150 <u>current</u> 3 3 1 1 <u>current</u> 1.3 9.7 22.0 | 6 0 69 <1 1057 1200 1147 1406 3929 history1 4 3 0 <u>history1</u> 1.4 1.4 10.3 22.3 | 2 0 68 0 1117 1283 1154 1494 3984 history2 4 7 0 history2 1.2 1.2 1.2 11.4 23.1 |



OIL ANALYSIS REPORT





| Jan 18/22 Feb 17/23 Feb 17/23 Oct 13/23 Oct 13/23 | White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar scalar scalar scalar scalar scalar scalar | *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual method ASTM D445 | NONE NONE NONE NONE NONE NONE NORML NORML >0.2 Iimit/base 15.4 | NONE NONE NONE NONE NORML NORML NORML NEG NEG Current | NONE NONE NONE NONE NORML NORML NEG NEG history1 14.8 | NONE NONE NONE NONE NORML NORML NEG NEG history2 14.8 | |
|--|--|---|--|--|--|--|--|--|
| 1723 | Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar scalar scalar scalar | *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual | NONE NONE NONE NORML NORML >0.2 Iimit/base | NONE NONE NONE NORML NORML NEG NEG | NONE NONE NONE NORML NORML NEG NEG history1 | NONE NONE NONE NORML NORML NEG NEG history2 | |
| 1723 | Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar scalar scalar scalar | *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual | NONE NONE NONE NORML NORML >0.2 Iimit/base | NONE NONE NONE NORML NORML NEG NEG | NONE NONE NONE NORML NORML NEG NEG history1 | NONE NONE NONE NORML NORML NEG NEG history2 | |
| 1723 | Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar scalar scalar | *Visual *Visual *Visual *Visual *Visual *Visual *Visual method | NONE NONE NORML NORML >0.2 Iimit/base | NONE NONE NORML NORML NEG NEG | NONE NONE NORML NORML NEG NEG history1 | NONE NONE NORML NORML NEG NEG history2 | |
| 1723 | Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar scalar RTIES | *Visual *Visual *Visual *Visual *Visual *Visual method | NONE NORML NORML >0.2 limit/base | NONE NORML NORML NEG NEG | NONE NORML NORML NEG NEG history1 | NONE NORML NORML NEG NEG history2 | |
| 1723 | Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar scalar RTIES | *Visual *Visual *Visual *Visual *Visual method | NONE NORML NORML >0.2 limit/base | NONE NORML NORML NEG NEG | NONE NORML NORML NEG history1 | NONE NORML NORML NEG NEG history2 | |
| 1723 | Appearance Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar scalar RTIES | *Visual *Visual *Visual *Visual method | NORML NORML >0.2 limit/base | NORML NORML NEG NEG current | NORML NORML NEG NEG history1 | NORML NORML NEG NEG history2 | |
| 1723 | Odor Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar scalar RTIES | *Visual *Visual *Visual method | NORML >0.2 limit/base | NORML NEG NEG current | NORML NEG NEG history1 | NORML NEG NEG history2 | |
| 1723 | Emulsified Water Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) | scalar scalar RTIES | *Visual *Visual method | >0.2 limit/base | NEG NEG current | NEG NEG history1 | NEG NEG history2 | |
| Jan 18/22 Feb 17/23 | Free Water FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) ²⁵⁰ 200 Severe | scalar RTIES | *Visual method | limit/base | NEG current | NEG history1 | NEG history2 | |
| Jan 18/22 Feb 17/23 | FLUID PROPE Visc @ 100°C GRAPHS Iron (ppm) 200 Severe | RTIES | method | | current | history1 | history2 | |
| Jan 18/22 Feb 17/23 | Visc @ 100°C GRAPHS Iron (ppm) | | | | | | | |
| Jan 19/22 + | GRAPHS Iron (ppm) | | | | | | | |
| Jan 18/22 | Iron (ppm) | | | | | | | |
| Jan 18/22 Feb 17/23 | 250 200 Severe | | | | | | | |
| Jan 1 8/22 + Feb 1 7/23 - | 200 Severe | | | 100 | Lead (ppm) | | | |
| Jan 18/ Feb 17/ | | | | 80 | Severe | | | |
| | | | | 0.0 | Fredericken | | | |
| | 150 - Abnormal | | ٨ | E 40 | Abnormal | | | |
| | | ~ 1 | L _ | | | | | |
| | | \sim | | and the second s | La | $\sim\sim\sim$ | | |
| | 2/15 7/15 4/16 | 4/19 | 8/20 - 8/22 - 7/23 - | | 2/15 - 7/15 - | 4/19 - 4/19 - 8/20 - | Jan18/22 - Feb17/23 - Oct19/23 - | |
| | Apr Sep1 Sep1 Jul2 | Nov | Oct Jan1 Feb1 | 0ct1 | Apr Sep1 Sep1 | Jul2 Nov Oct | Jan 18/22 Feb 17/23 Oct1 9/23 | |
| | Aluminum (ppm) | | | | Chromium (pp | m) | | |
| | 50 | | | 50 | | | 111111111111 | |
| | | | | 40 | The state state | | | |
| | E 30 Abnormal | | | E 30 | | | | |
| | 20- | | | ² 20 | Abnormal | | | |
| | 10 - | | | 10 | | | | |
| | | 6 | | | | 19 | 23 | |
| | Apr2/ ep17/ ep14/ | Vov4/ | 0ct8// an 18// eb 17// | ct19// | Apr2/ ep17/ | ul24/ Vov4/ Oct8/ | Jan 18/22 Feb 17/23 Oct19/23 | |
| | ••• ••• | - | Ϋ́ Ψ | 0 | 00 00 | 7 2 | n i o | |
| | | | | 80 | | | | |
| | 800 - | | | CO | | | | |
| _ | 600 - | | L A L L | | | | | |
| hpr | | | /\ A | <u>특</u> 40 | Abnormal | J | | |
| | 200 | | 11/1 | 20 | Abhonna | | ~ | |
| | | 19 | | | 16 | 20 20 20 | | |
| | Apr2/ Sep11/ Sep14/ Jul24/ | Nov4/ | 0ct8/ Jan18/ Feb17/ | 0ct19/ | Apr2/ Sep17/ Sep14/ | Jul24/ Nov4/ Oct8/ | Jan 18/22 Feb 17/23 Oct19/23 | |
| | Viscosity @ 100°C | | | | Base Number | | | |
| | 18 Abnormal | | | (B/HO | | | | |
| 1000 | 5 16 - Base | | ~ | ⊇ 15.0 E | Page | | | |
| | Abnormal | \sim | くく | 10.0 g | Dase | | | |
| | | | | N 5.0 | | | | |
| | 8 | | | 0.0 | | | | |
| | r2/15 17/15 14/16 | 04/19 | t8/20 18/22 7/23 | 19/23 | r2/15 17/15 14/16 | 24/18 /4/19 /8/20 | Jan 18/22 Feb 17/23 Oct19/23 | |
| | Ap Sep1 Sep1 Jul2 | No | Jan1 Feb1 | 0ct | Ap Sep1 | Jul. Nor Ocr | Jan Feb1 | |
| aboratory ample No. ab Number nique Number est Package | : MOB 1 (Additional Tests: TBN) Conta | | | | | | | |
| a a r e a | aboratory ample No. ab Number nique Number est Package mple report, o rethods that a | Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Copper (ppm) Uiscosity @ 100°C Aluminum (ppm) Uiscosity @ 100°C Aluminum (ppm) Copper (ppm) Uiscosity @ 100°C Aluminum (ppm) Copper | Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Copper (ppm) Copper (ppm) Viscosity @ 100°C Aluminum (ppm) Copper (ppm) Viscosity @ 100°C Aluminum (ppm) Copper (ppm) Copp | Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Aluminum (ppm) Copper (ppm) Opper (ppm) Viscosity @ 100°C Opper (ppm) Opper (ppm) Copper (ppm) Co | Aluminum (ppm) Aluminum (ppm) | Aluminum (ppm) Aluminum (ppm) | Aluminum (ppm) Aluminum (ppm) | |