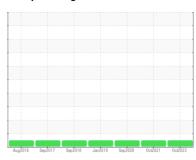


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Machine Id **2412** Component

Diesel Engine

PETRO CANADA 15W40 (--- QTS)

| D | IΑ | NI | | |
|---|----|----|--|--|
| - | | | | |

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

Elevated aluminum (Al) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. There is no indication of any contamination in the oil.

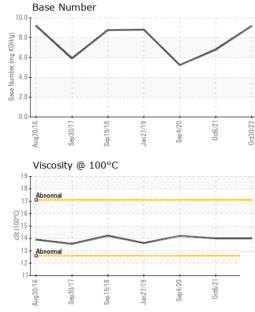
Fluid Condition

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

| SAMPLE INFORMATION method imitibase current history1 history2 Sample Number Client Info RW0004876 RW0002742 RW0001099 Sample Date Client Info 80 81 6209 4559 2020 455 | | | Aug2016 | Sep2017 Sep2018 | Jan2019 Sep2020 Oct2021 | Oct2023 | | |
|--|--|------------|-------------|-----------------|-------------------------|-------------|-------------|----|
| Sample Date | SAMPLE INFORM | MATION | method | limit/base | current | history1 | history2 | |
| Machine Age hrs Client Info 8081 6209 4659 Oil Age hrs Client Info 130 330 500 Oil Changed Client Info Changed | Sample Number | | Client Info | | RW0004876 | RW0002742 | RW0001099 | |
| Oil Age Oil Changed Oil Changed Sample Status hrs Client Info Changed Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL Changed Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL NORMAL CONTAMINATION method Mimit base current history history2 history2 Fuel WC Method NEG | Sample Date | | Client Info | | 30 Oct 2023 | 06 Oct 2021 | 04 Sep 2020 | |
| Oil Changed Sample Status Client Info Changed NORMAL Changed NoRMAN Change And NoRMAN Changed NoRMAN Change And NoRMAN Change And NoRMAN | Machine Age | hrs | Client Info | | 8081 | 6209 | 4659 | |
| Sample Status | Oil Age | hrs | Client Info | | 130 | 330 | 500 | |
| CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 8 16 24 Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >4 <1 0 <1 166 0 Silver ppm ASTM D5185m >3 0 0 0 0 Aluminum ppm ASTM D5185m >30 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 | Oil Changed | | Client Info | | Changed | Changed | Changed | |
| Fuel | Sample Status | | | | NORMAL | NORMAL | NORMAL | |
| WEAR METALS | CONTAMINATION | ٧ | method | limit/base | current | history1 | history2 | |
| WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 8 16 24 Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >20 <1 16 0 Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >330 <1 <1 <1 Lead ppm ASTM D5185m >40 <1 <1 <1 Copper ppm ASTM D5185m >15 0 <1 <1 <1 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Vanadium ppm ASTM D5185m 0 <1 <0 <1 Cadmium ppm ASTM D5185m 106 <t< th=""><th>Fuel</th><th></th><th>WC Method</th><th>>5</th><th><1.0</th><th><1.0</th><th><1.0</th></t<> | Fuel | | WC Method | >5 | <1.0 | <1.0 | <1.0 | |
| Iron | Glycol | | WC Method | | NEG | NEG | NEG | |
| Chromium ppm ASTM D5185m >20 <1 | WEAR METALS | | method | limit/base | current | history1 | history2 | |
| Nickel | Iron | ppm | ASTM D5185m | >100 | 8 | 16 | 24 | |
| Titanium ppm ASTM D5185m <1 | Chromium | ppm | ASTM D5185m | >20 | <1 | <1 | 1 | |
| Silver | Nickel | ppm | ASTM D5185m | >4 | <1 | 0 | <1 | |
| Aluminum ppm ASTM D5185m >20 4 10 12 Lead ppm ASTM D5185m >40 <1 <1 <1 Copper ppm ASTM D5185m >330 <1 <1 2 Tin ppm ASTM D5185m >15 0 <1 <1 Antimony ppm ASTM D5185m 0 <1 <1 <1 Vanadium ppm ASTM D5185m 0 <1 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 0 <1 0 <1 0 0 <1 0 0 <1 0 0 <1 0 0 <1 <1 0 0 <1 <1 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <th>Titanium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th><1</th> <th>16</th> <th>0</th> | Titanium | ppm | ASTM D5185m | | <1 | 16 | 0 | |
| Lead | | ppm | ASTM D5185m | >3 | 0 | 0 | 0 | |
| Copper ppm ASTM D5185m >330 <1 | Aluminum | ppm | | >20 | 4 | 10 | 12 | |
| Tin ppm ASTM D5185m >15 0 <1 | Lead | ppm | | | <1 | <1 | <1 | |
| Antimony ppm ASTM D5185m <1 | Copper | ppm | ASTM D5185m | >330 | <1 | <1 | 2 | |
| Vanadium ppm ASTM D5185m 0 <1 | | ppm | ASTM D5185m | >15 | 0 | <1 | <1 | |
| Cadmium ppm ASTM D5185m <1 | Antimony | ppm | ASTM D5185m | | | <1 | <1 | |
| ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 106 256 49 Barium ppm ASTM D5185m 2 0 0 Molybdenum ppm ASTM D5185m 7 62 12 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 716 1010 969 Zinc ppm ASTM D5185m 861 1214 1190 Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 13 </th <th>Vanadium</th> <th>ppm</th> <th></th> <th></th> <th>_</th> <th></th> <th>-</th> | Vanadium | ppm | | | _ | | - | |
| Boron ppm ASTM D5185m 106 256 49 Barium ppm ASTM D5185m 2 0 0 Molybdenum ppm ASTM D5185m 7 62 12 Manganese ppm ASTM D5185m 0 <1 | Cadmium | ppm | ASTM D5185m | | <1 | 0 | 0 | |
| Barium ppm ASTM D5185m 2 0 0 Molybdenum ppm ASTM D5185m 7 62 12 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 92 443 174 Phosphorus ppm ASTM D5185m 1433 1405 2106 Phosphorus ppm ASTM D5185m 716 1010 969 Zinc ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 2 1 Potassium ppm ASTM D5185m >20 | ADDITIVES | | method | limit/base | current | history1 | history2 | |
| Molybdenum ppm ASTM D5185m 7 62 12 Manganese ppm ASTM D5185m 0 <1 | Boron | ppm | ASTM D5185m | | 106 | 256 | 49 | |
| Manganese ppm ASTM D5185m 0 <1 | <th>Barium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>2</th> <th>0</th> <th>0</th> | Barium | ppm | ASTM D5185m | | 2 | 0 | 0 |
| Magnesium ppm ASTM D5185m 92 443 174 Calcium ppm ASTM D5185m 1433 1405 2106 Phosphorus ppm ASTM D5185m 716 1010 969 Zinc ppm ASTM D5185m 861 1214 1190 Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 <td colsp<="" th=""><th>Molybdenum</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>-</th><th>62</th><th>12</th></td> | <th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>-</th> <th>62</th> <th>12</th> | Molybdenum | ppm | ASTM D5185m | | - | 62 | 12 |
| Calcium ppm ASTM D5185m 1433 1405 2106 Phosphorus ppm ASTM D5185m 716 1010 969 Zinc ppm ASTM D5185m 861 1214 1190 Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 | Manganese | ppm | ASTM D5185m | | 0 | <1 | <1 | |
| Phosphorus ppm ASTM D5185m 716 1010 969 Zinc ppm ASTM D5185m 861 1214 1190 Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/.1mm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current | | ppm | ASTM D5185m | | | | | |
| Zinc ppm ASTM D5185m 861 1214 1190 Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7644 >3 0.2 0.4 0.6 Nitration Abs/.1mm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 | | ppm | ASTM D5185m | | 1100 | | | |
| Sulfur ppm ASTM D5185m 2837 2969 2910 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/.mm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | | | | | _ | | | |
| CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | - | | | | | | | |
| Silicon ppm ASTM D5185m >25 3 3 4 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | | | ASTM D5185m | | 2837 | 2969 | 2910 | |
| Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | | | method | limit/base | current | history1 | history2 | |
| Potassium ppm ASTM D5185m >20 13 16 28 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | | | | >25 | | | | |
| INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | | ppm | | | | | | |
| Soot % % *ASTM D7844 >3 0.2 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | Potassium | ppm | ASTM D5185m | >20 | 13 | 16 | 28 | |
| Nitration Abs/cm *ASTM D7624 >20 7.6 9 12.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | INFRA-RED | | method | limit/base | | history1 | history2 | |
| Sulfation Abs/.1mm *ASTM D7415 >30 20.7 22.3 27 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.6 17.1 23 | Soot % | | | | | | | |
| FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2516.617.123 | Nitration | Abs/cm | *ASTM D7624 | >20 | 7.6 | | 12.2 | |
| Oxidation | Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 20.7 | 22.3 | 27 | |
| | FLUID DEGRADA | TION | method | limit/base | current | history1 | history2 | |
| Base Number (BN) mg KOH/g ASTM D2896 9.18 6.79 5.24 | Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 16.6 | 17.1 | 23 | |
| | Base Number (BN) | mg KOH/g | ASTM D2896 | | 9.18 | 6.79 | 5.24 | |



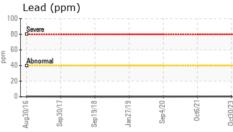
OIL ANALYSIS REPORT

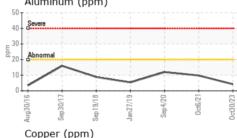


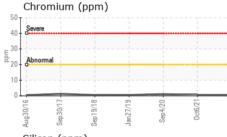
| VISUAL | | method | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Precipitate | 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 |
| Appearance | scalar | *Visual | NORML | NORML | NORML | NORML |
| Odor | scalar | *Visual | NORML | NORML | NORML | NORML |
| Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | NEG |
| Free Water | scalar | *Visual | | NEG | NEG | NEG |
| FLUID PROPERT | TIES | method | limit/base | current | historv1 | historv2 |

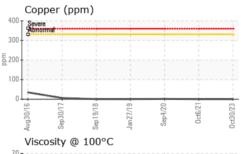
| Visc @ 100°C | cSt | ASTM D445 | 14.0 | 14.0 | 14.2 |
|--------------|-----|-----------|------|------|------|

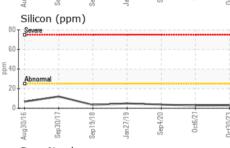
| Iror | (ppm) |) | | | | | |
|----------|---------|----------|----------|----------------|--------|----------|--|
| Sever | e | | į | į | | | |
| 450 | | | | | | | |
| Abno | rmal | | | | | | |
| 50- | | | | | | | |
| 0 50 | | - | - | - 0 | + | 3 | |
| Aug30/16 | Sep30/1 | Sep19/18 | Jan27/19 | Sep4/2 | 0ct6/2 | Oct30/23 | |
| Alur | minum | (ppm) | | | | | |

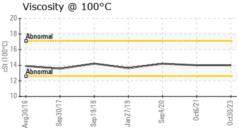


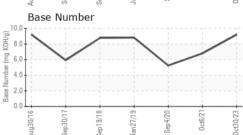














Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : RW0004876 : 05999203 : 10727563

Received Diagnosed Diagnostician

: 06 Nov 2023 : 07 Nov 2023 : Wes Davis

NEWKIRK ELECTRIC 1875 ROBERTS ST. MUSKEGON, MI US 49442 Contact: ERIC KING

ewking@newkirk-electric.com

T: (231)206-6131 F: (231)724-4090

To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

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