

# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id 948006-205261 Component

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (--- LTR)

## DIAGNOSIS

#### Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

# 🔺 Wear

The copper level is abnormal. All other 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 Date     Client Info     07 Feb 2024     11 Oct 2023     11 Jul 2023       Machine Age     hrs     Client Info     16035     66756     14855       Dil Age     hrs     Client Info     6600     600     600       Sample Status     Client Info     Changed     Changed     Oll Added       Sample Status     Client Info     Changed     NEG     NEG     NEG       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >2     0     <1     0       Nickel     ppm     ASTM D5185m     >3     0     0     0     0       Silver     ppm     ASTM D5185m     >3     0     0     0     0       Capper     ppm     ASTM D5185m     >3     5     1     0     0   | SAMPLE INFORM   | MATION   | method  | limit/base  | current   | history1   | history2   |       |
|---|---|--|---|---|---|--|--|-------|
| Machine Age     hrs     Client Info     16035     66756     14855       Dil Age     hrs     Client Info     600     600     600       Dil Age     Nrs     Client Info     Changed     Changed     Oil Added       Sample Status     Imit Dase     current     NoRMAL     ABNORMAL     NoRMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       Formum     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >22     0     <11     0       Silver     ppm     ASTM D5185m     >20     0     0     0       Auminum     ppm     ASTM D5185m     >30     2     <1     <1     1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1 <th>Sample Number</th> <th></th> <th>Client Info</th> <th></th> <th>GFL0096048</th> <th>GFL0095979</th> <th>GFL0071719</th> | Sample Number   |  | Client Info   |   | GFL0096048  | GFL0095979   | GFL0071719   |       |
| Dil Age hrs Client Info 600 600 600   Dil Changed Client Info Changed Changed Oil Added   Sample Status Image Image ABNORMAL Normal ABNORMAL   CONTAMINATION method limit/base current history1 history2   Water WC Method >0.1 NEG NEG NEG   WEAR METALS method limit/base current history1 history2   Iron ppm ASTM D5185m >50 9 30 10   Chromium ppm ASTM D5185m >2 0 <1 0   Nickel ppm ASTM D5185m >3 0 0 0   Aluminum ppm ASTM D5185m >3 0 0 0   Aluminum ppm ASTM D5185m >3 2 <1 <1   Cadeadu ppm ASTM D5185m >3 54 2 1   Variandium ppm ASTM D5185m >3 54 2 1   Variandium ppm ASTM D5185m 50 52 55 54   Variandium ppm ASTM D5185m 50 <th>Sample Date</th> <th></th> <th>Client Info</th> <th></th> <th>07 Feb 2024</th> <th>11 Oct 2023</th> <th>11 Jul 2023</th>  | Sample Date   |  | Client Info   |   | 07 Feb 2024   | 11 Oct 2023  | 11 Jul 2023  |       |
| Cili Changed<br>Sample StatusCilient InfoChanged<br>ABNORMALChanged<br>ABNORMALOil Added<br>ABNORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2WaterWC Method>0.1NEGNEGNEGWEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185m>5093010ChromiumppmASTM D5185m>20<10NickelppmASTM D5185m>3000SilverppmASTM D5185m>3000SilverppmASTM D5185m>3000CopperppmASTM D5185m>35421CopperppmASTM D5185m>41<1< <td>&lt;1&lt;</td> CadmiumppmASTM D5185m>41<1<0AddiumppmASTM D5185m50301611BaronppmASTM D5185m50301611BaronppmASTM D5185m50525554MaganeseppmASTM D5185m503201521540PhosphorusppmASTM D5185m70111221540PhosphorusppmASTM D5185m70182239362SuffarppmASTM D5185m2040240124362796ContaliumppmASTM D5185m <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>16035</th> <th>66756</th> <th>14855</th>   | <1<   | Machine Age  | hrs   | Client Info   |   | 16035  | 66756  | 14855 |
| Sample Status     Imitable     ABNORMAL     NORMAL     ABNORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >2     0     <1     0       Silver     ppm     ASTM D5185m     >3     0     0     0       Silver     ppm     ASTM D5185m     >3     2     <1     <1       Copper     ppm     ASTM D5185m     >3     2     <1     <1       Copper     ppm     ASTM D5185m     >3     0     0     0       Cadmium     ppm     ASTM D5185m     >4     1     <1<     <1       Norental     ppm     ASTM D5185m     >5     30     16     11   | Oil Age   | hrs  | Client Info   |   | 600   | 600  | 600  |       |
| CONTAMINATION   method   limit/base   current   history1   history2     Water   WC Method   >0.1   NEG   NEG   NEG     WEAR METALS   method   limit/base   current   history1   history2     Iron   ppm   ASTM D5185m   >50   9   30   10     Chromium   ppm   ASTM D5185m   >2   0   <11   0     Nickel   ppm   ASTM D5185m   >2   0   <11   0     Silver   ppm   ASTM D5185m   >3   0   0   0     Aluminum   ppm   ASTM D5185m   >3   2   <1   <1     Copper   ppm   ASTM D5185m   >35   ▲   54   2   1     Cadmium   ppm   ASTM D5185m   >5   1   0   0   0     Cadmium   ppm   ASTM D5185m   50   30   16   11     Barium   ppm   ASTM D5185m   50   52   55   54     Barium   ppm   ASTM D5185m   50   | Oil Changed   |  | Client Info   |   | Changed   | Changed  | Oil Added  |       |
| Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >2     0     <1     0       Nickel     ppm     ASTM D5185m     >2     0     0     0       Silver     ppm     ASTM D5185m     >3     0     0     0       Lead     ppm     ASTM D5185m     >3     0     0     0       Copper     ppm     ASTM D5185m     >3     54     2     1       Tin     ppm     ASTM D5185m     >4     1     <1     0       Cadmium     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     50     52     55     54       Maganese     ppm     ASTM D5185m     50     52     55     54   | Sample Status   |  |   |   | ABNORMAL  | NORMAL   | ABNORMAL   |       |
| WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >4     <1     2     <1       Nickel     ppm     ASTM D5185m     >2     0     <1     0       Titanium     ppm     ASTM D5185m     >3     0     0     0       Silver     ppm     ASTM D5185m     >30     2     <1     1       Lead     ppm     ASTM D5185m     >30     2     <1     1       Copper     ppm     ASTM D5185m     >30     2     <1     1       Vanadium     ppm     ASTM D5185m     >4     1     <1     <1       Vanadium     ppm     ASTM D5185m     50     30     16     1     1       Vanadium     ppm     ASTM D5185m     5     5     5     5     5       Boron     ppm     ASTM D5185m     5  | CONTAMINAT  | ION  | method  | limit/base  | current   | history1   | history2   |       |
| ron     ppm     ASTM D5185m     >50     9     30     10       Chromium     ppm     ASTM D5185m     >4     <1     2     <1       Nickel     ppm     ASTM D5185m     >2     0     <1     0       Silver     ppm     ASTM D5185m     >3     0     0     0       Aluminum     ppm     ASTM D5185m     >3     2     <1     <1       Copper     ppm     ASTM D5185m     >3     2     <1     <1       Copper     ppm     ASTM D5185m     >4     1     <1     <1       Vanadium     ppm     ASTM D5185m     >4     1     <1     <1       Vanadium     ppm     ASTM D5185m     50     30     16     11       Vanadium     ppm     ASTM D5185m     50     52     55     54       Barium     ppm     ASTM D5185m     50     52     55     54       Maganesium     ppm     ASTM D5185m     50     52     55 </th <th>Water</th> <th></th> <th>WC Method</th> <th>&gt;0.1</th> <th>NEG</th> <th>NEG</th> <th>NEG</th>  | Water   |  | WC Method   | >0.1  | NEG   | NEG  | NEG  |       |
| Chromium     ppm     ASTM D5185m     >4     <1  | WEAR METAL  | S  | method  | limit/base  | current   | history1   | history2   |       |
| Nickel     ppm     ASTM D5185m     >2     0     <1  | Iron  | ppm  | ASTM D5185m   | >50   | 9   | 30   | 10   |       |
| Titanium     ppm     ASTM D5185m     2     <1   | Chromium  | ppm  | ASTM D5185m   | >4  | <1  | 2  | <1   |       |
| Silver     ppm     ASTM D5185m     >3     0     0     0       Aluminum     ppm     ASTM D5185m     >9     1     3     3       Lead     ppm     ASTM D5185m     >30     2     <1   | Nickel  | ppm  | ASTM D5185m   | >2  | 0   | <1   | 0  |       |
| AluminumppmASTM D5185m>9133LeadppmASTM D5185m>302<1<1CopperppmASTM D5185m>355421TinppmASTM D5185m>41<1<1VanadiumppmASTM D5185m>41<10CadmiumppmASTM D5185m0000ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m50301611BariumppmASTM D5185m50525554MaganeseppmASTM D5185m50829571489CalciumppmASTM D5185m1510115115221540PhosphorusppmASTM D5185m1510115115221540PhosphorusppmASTM D5185m870852993962SulfurppmASTM D5185m2040240124362796CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10014113SodiumppmASTM D5185m>20153INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%%*ASTM D784000.1NitrationAbs/cm*ASTM D784207.0<  | Titanium  | ppm  | ASTM D5185m   |   | 2   | <1   | 0  |       |
| Lead     ppm     ASTM D5185m     >30     2     <1   | Silver  | ppm  | ASTM D5185m   | >3  | 0   | 0  | 0  |       |
| Copper     ppm     ASTM D5185m     >35     54     2     1       Tin     ppm     ASTM D5185m     >4     1     <1     <1       Vanadium     ppm     ASTM D5185m     >4     1     <1     <1       Vanadium     ppm     ASTM D5185m     0     0     0     0       Cadmium     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     50     52     55     54       Maganese     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     2401     2436     2796       CONTAMINATS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     14     11  | Aluminum  | ppm  | ASTM D5185m   | >9  | 1   | 3  | 3  |       |
| Tin     ppm     ASTM D5185m     >4     1     <1   | Lead  | ppm  | ASTM D5185m   | >30   | 2   | <1   | <1   |       |
| Vanadium     ppm     ASTM D5185m     <1   | Copper  | ppm  | ASTM D5185m   | >35   | <u> </u>  | 2  | 1  |       |
| Cadmium     ppm     ASTM D5185m     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     50     52     55     54       Barium     ppm     ASTM D5185m     50     52     55     54       Manganese     ppm     ASTM D5185m     0     7     1     <1  | Tin   | ppm  | ASTM D5185m   | >4  | 1   | <1   | <1   |       |
| ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     50     52     55     54       Manganese     ppm     ASTM D5185m     50     52     55     54       Magnesium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >20 <th>Vanadium</th> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>&lt;1</th> <td>&lt;1</td> <td>0</td>                 | Vanadium  | ppm  | ASTM D5185m   |   | <1  | <1   | 0  |       |
| Boron     ppm     ASTM D5185m     50     30     16     11       Barium     ppm     ASTM D5185m     5     1     0     0       Molybdenum     ppm     ASTM D5185m     50     52     55     54       Manganese     ppm     ASTM D5185m     0     7     1     <1       Magnesium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     14     11     3       Sodium     ppm     ASTM D5185m     >20   | Cadmium   | ppm  | ASTM D5185m   |   | 0   | 0  | 0  |       |
| Barium     ppm     ASTM D5185m     5     1     0     0       Molybdenum     ppm     ASTM D5185m     50     52     55     54       Manganese     ppm     ASTM D5185m     0     7     1     <1       Magnesium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     1510     1151     1522     1540       Phosphorus     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     c   |   |  |   |   |   |  |  |       |
| Molybdenum     ppm     ASTM D5185m     50     52     55     54       Manganese     ppm     ASTM D5185m     0     7     1     <1       Magnesium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     'ASTM D7844     0  | ADDITIVES   |  | method  | limit/base  | current   | history1   | history2   |       |
| Manganese     ppm     ASTM D5185m     0     7     1     <1  | ADDITIVES<br>Boron  | ppm  |   |   |   |  |  |       |
| Magnesium     ppm     ASTM D5185m     560     829     571     489       Calcium     ppm     ASTM D5185m     1510     1151     1522     1540       Phosphorus     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/.mm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.lmm     *ASTM D7624     >20 <th></th> <td></td> <td>ASTM D5185m</td> <td>50</td> <th>30</th> <td>16</td> <td>11</td>                  |   |  | ASTM D5185m   | 50  | 30  | 16   | 11   |       |
| Calcium     ppm     ASTM D5185m     1510     1151     1522     1540       Phosphorus     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base   | Boron<br>Barium   | ppm  | ASTM D5185m<br>ASTM D5185m  | 50<br>5   | 30<br>1   | 16<br>0  | 11<br>0  |       |
| Phosphorus     ppm     ASTM D5185m     780     722     797     724       Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >+20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7624     >20  | Boron   | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 50<br>5<br>50   | 30<br>1<br>52   | 16<br>0<br>55  | 11<br>0<br>54  |       |
| Zinc     ppm     ASTM D5185m     870     852     993     962       Sulfur     ppm     ASTM D5185m     2040     2401     2436     2796       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     >+20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25<  | Boron<br>Barium<br>Molybdenum   | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>5<br>50<br>0  | 30<br>1<br>52<br>7  | 16<br>0<br>55<br>1   | 11<br>0<br>54<br><1  |       |
| SulfurppmASTM D5185m2040240124362796CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10014113SodiumppmASTM D5185m>+10014113PotassiumppmASTM D5185m>20153INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000.1NitrationAbs/cm*ASTM D7624>207.09.010.7SulfationAbs/.1mm*ASTM D7415>3019.719.020.6FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2516.515.718.2   | Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 50<br>5<br>50<br>0<br>560   | 30<br>1<br>52<br>7<br>829   | 16<br>0<br>55<br>1<br>571  | 11<br>0<br>54<br><1<br>489   |       |
| CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10014113SodiumppmASTM D5185m191812PotassiumppmASTM D5185m>20153INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000.1NitrationAbs/cm*ASTM D7624>207.09.010.7SulfationAbs/.1mm*ASTM D7615>3019.719.020.6FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2516.515.718.2   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>5<br>50<br>0<br>560<br>1510   | 30<br>1<br>52<br>7<br>829<br>1151   | 16<br>0<br>55<br>1<br>571<br>1522  | 11<br>0<br>54<br><1<br>489<br>1540   |       |
| Silicon     ppm     ASTM D5185m     >+100     14     11     3       Sodium     ppm     ASTM D5185m     19     18     12       Potassium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7615     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2  | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>5<br>50<br>0<br>560<br>1510<br>780  | 30<br>1<br>52<br>7<br>829<br>1151<br>722  | 16<br>0<br>55<br>1<br>571<br>1522<br>797   | 11<br>0<br>54<br><1<br>489<br>1540<br>724  |       |
| Sodium     ppm     ASTM D5185m     19     18     12       Potassium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2  | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 50<br>5<br>50<br>0<br>560<br>1510<br>780<br>870   | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852   | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993  | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962   |       |
| Potassium     ppm     ASTM D5185m     >20     1     5     3       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2  | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>5<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040   | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401   | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436  | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796   |       |
| INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000.1NitrationAbs/cm*ASTM D7624>207.09.010.7SulfationAbs/.1mm*ASTM D7415>3019.719.020.6FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2516.515.718.2  | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br>Iimit/base  | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current  | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1  | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2   |       |
| Soot %     %     *ASTM D7844     0     0     0.1       Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2  | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS                             | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 50<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br>Iimit/base  | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14  | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11  | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3  |       |
| Nitration     Abs/cm     *ASTM D7624     >20     7.0     9.0     10.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS                             | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 50<br>5<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br><b>limit/base</b><br>>+100                                     | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19  | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18  | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12  |       |
| Sulfation     Abs/.1mm     *ASTM D7415     >30     19.7     19.0     20.6       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS                             | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 50<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br><b>limit/base</b><br>>+100  | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1   | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5   | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3   |       |
| FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm<br>ppm        | ASTM D5185m<br>ASTM D5185m   | 50<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br><b>limit/base</b><br>>+100  | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1<br>current                                | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5<br>5<br>history1                                    | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3<br>history2   |       |
| Oxidation     Abs/.1mm     *ASTM D7414     >25     16.5     15.7     18.2   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm<br>ppm        | ASTM D5185m<br>ASTM D5185m   | 50<br>5<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br>limit/base<br>>+100<br>>20<br>limit/base                       | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1<br>current<br>0                           | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5<br>5<br>history1<br>0                               | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3<br>12<br>3<br>history2<br>0.1                             |       |
|   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %                           | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm<br>ppm        | ASTM D5185m<br>ASTM D5185m                              | 50<br>50<br>00<br>560<br>1510<br>780<br>870<br>2040<br><b>Iimit/base</b><br>>+100<br><b>iimit/base</b>                    | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1<br>current<br>0<br>7.0                    | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5<br>history1<br>0<br>9.0                             | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3<br>12<br>3<br>history2<br>0.1<br>10.7                     |       |
|   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m<br>ASTM D5185m               | 50<br>5<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br><b>Iimit/base</b><br>>+100<br>                                 | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1<br>current<br>0<br>7.0<br>19.7            | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5<br><b>history1</b><br>0<br>9.0<br>19.0              | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3<br>12<br>3<br>history2<br>0.1<br>10.7<br>20.6             |       |
| Base Number (BN)     mg KOH/g     ASTM D2896     10.2     9.0     7.2     6.1   | Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                     | ASTM D5185m<br>ASTM D7844<br>*ASTM D7624 | 50<br>50<br>0<br>560<br>1510<br>780<br>870<br>2040<br><b>limit/base</b><br>>+100<br><b>limit/base</b><br>>20<br>>20<br>30 | 30<br>1<br>52<br>7<br>829<br>1151<br>722<br>852<br>2401<br>current<br>14<br>19<br>1<br>current<br>0<br>7.0<br>19.7<br>current | 16<br>0<br>55<br>1<br>571<br>1522<br>797<br>993<br>2436<br>history1<br>11<br>18<br>5<br>history1<br>0<br>9.0<br>19.0<br>19.0<br>history1 | 11<br>0<br>54<br><1<br>489<br>1540<br>724<br>962<br>2796<br>history2<br>3<br>12<br>3<br>12<br>3<br>history2<br>0.1<br>10.7<br>20.6<br>history2 |       |

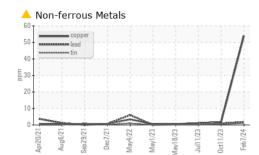


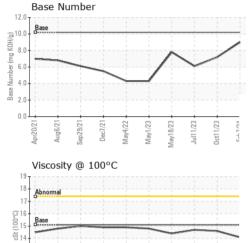
13 Abnor 12

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Apr20/21 Aug6/21 10/02 up

# **OIL ANALYSIS REPORT**





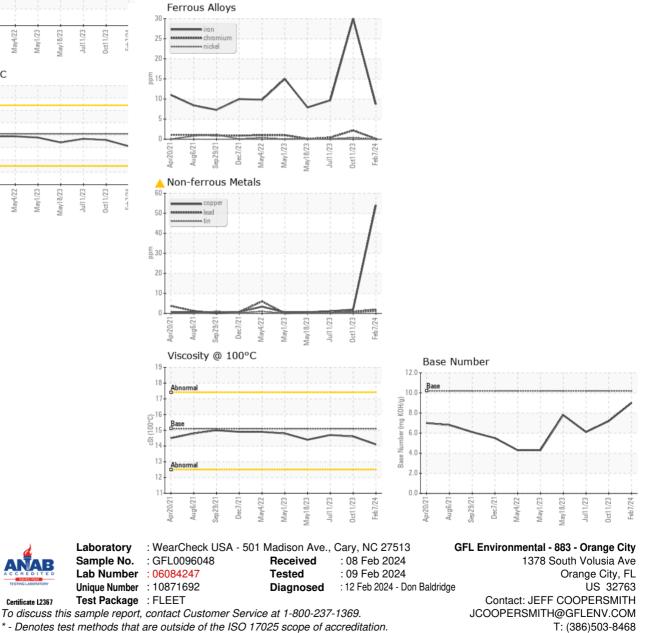
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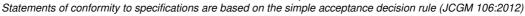
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Dec7/21

CC/1/2

| 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     | A MODER  |
| 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   | >0.1       | NEG     | NEG      | 0.2%     |
| Free Water       | scalar | *Visual   |            | NEG     | NEG      | NEG      |
| FLUID PROPE      | RTIES  | method    | limit/base | current | history1 | history2 |
| Visc @ 100°C     | cSt    | ASTM D445 | 15.1       | 14.1    | 14.6     | 14.7     |
| GRAPHS           |        |           |            |         |          |          |





Certificate L2367

F: