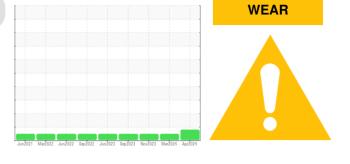


# **OIL ANALYSIS REPORT**

Sample Rating Trend

limit/base



current

history1

history2

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

SAMPLE INFORMATION method

| DIAGNOSIS        |
|------------------|
| A Recommendation |

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

Machine Id 4501M

## 🔺 Wear

Valve wear is indicated. All other component wear rates are normal.

## Contamination

There is no indication of any contamination in the oil.

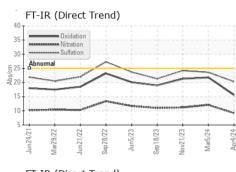
## Fluid Condition

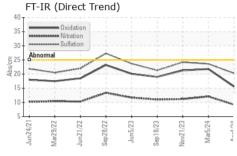
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

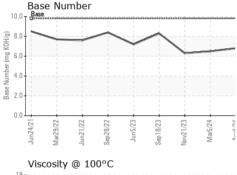
|  |  | method   | limit/base  | current  | nistory i  | nistory2   |
|--|--|--|---|--|--|--|
| Sample Number  |  | Client Info  |   | GFL0116915   | GFL0107795   | GFL0096563   |
| Sample Date  |  | Client Info  |   | 04 Apr 2024  | 05 Mar 2024  | 21 Nov 2023  |
| Machine Age  | hrs  | Client Info  |   | 10269  | 10134  | 9674   |
| Oil Age  | hrs  | Client Info  |   | 600  | 600  | 600  |
| Oil Changed  |  | Client Info  |   | Changed  | Changed  | Changed  |
| Sample Status  |  |  |   | ABNORMAL   | NORMAL   | NORMAL   |
|  |  |  | 11 1.0  |  |  |  |
| CONTAMINAT   | ION  | method   | limit/base  | current  | history1   | history2   |
| Fuel   |  | WC Method  | >3.0  | <1.0   | <1.0   | <1.0   |
| Water  |  | WC Method  | >0.2  | NEG  | NEG  | NEG  |
| Glycol   |  | WC Method  |   | NEG  | NEG  | NEG  |
| WEAR METAL   | S  | method   | limit/base  | current  | history1   | history2   |
| Iron   | ppm  | ASTM D5185m  | >90   | 23   | 57   | 52   |
| Chromium   | ppm  | ASTM D5185m  | >20   | 2  | 3  | 1  |
| Nickel   | ppm  | ASTM D5185m  | >2  | ▲ 5  | <1   | <1   |
| Titanium   | ppm  | ASTM D5185m  | >2  | <1   | 0  | 0  |
| Silver   | ppm  | ASTM D5185m  | >2  | <1   | 0  | 0  |
| Aluminum   | ppm  | ASTM D5185m  | >20   | 2  | 5  | 6  |
| Lead   | ppm  | ASTM D5185m  | >40   | 1  | 0  | 0  |
| Copper   | ppm  | ASTM D5185m  | >330  | 2  | 3  | 3  |
| Tin  | ppm  |  | >15   | 2  | 1  | <1   |
| Vanadium   | ppm  | ASTM D5185m  | 210   | <1   | 0  | 0  |
| Cadmium  | ppm  | ASTM D5185m  |   | <1   | 0  | 0  |
|  | ppm  |  |   |  | -  | -  |
|  |  | mathad   | limit/hooo  | ourront  | biotonut   |  |
| ADDITIVES  |  | method   | limit/base  | current  | history1   | history2   |
| Boron  | ppm  | ASTM D5185m  | 0   | 0  | 0  | 1  |
| Boron<br>Barium  | ppm  | ASTM D5185m<br>ASTM D5185m   | 0   | 0<br>0   | 0  | 1<br>2   |
| Boron<br>Barium<br>Molybdenum  | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60  | 0<br>0<br>64   | 0<br>0<br>57   | 1<br>2<br>60   |
| Boron<br>Barium<br>Molybdenum<br>Manganese   | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0   | 0<br>0<br>64<br>1  | 0<br>0<br>57<br><1   | 1<br>2<br>60<br><1   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium  | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010   | 0<br>0<br>64<br>1<br>1039  | 0<br>0<br>57<br><1<br>1037   | 1<br>2<br>60<br><1<br>879  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium   | 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   | 0<br>0<br>60<br>0<br>1010<br>1070   | 0<br>0<br>64<br>1<br>1039<br>1196  | 0<br>0<br>57<br><1<br>1037<br>1174   | 1<br>2<br>60<br><1<br>879<br>1048  |
| 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   | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990  | 1<br>2<br>60<br><1<br>879<br>1048<br>930   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc   | 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  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200   |
| 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  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990  | 1<br>2<br>60<br><1<br>879<br>1048<br>930   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc   | 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  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200   |
| 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  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060  | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734   |
| 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                                   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060  | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current   | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon  | 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  | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5  | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10   |
| 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<br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4   | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7   | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36   |
| 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   | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25  | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>2   | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1  | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2  |
| 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><b>TS</b><br>ppm<br>ppm        | ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>>20<br>limit/base<br>>20  | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>2<br>current<br>0.9                                   | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1   | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>5<br>history2<br>1.1                                |
| 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   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br><b>TS</b><br>ppm<br>ppm<br>ppm | ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>20<br>limit/base<br>>20   | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>2<br>current<br>0.9<br>9.2                            | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1<br>1.1<br>1.2.1                           | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2<br>1.1<br>1.1<br>11.2                      |
| 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<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 D5185m   | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>Iimit/base</b><br>>25<br><b>S</b><br><b>S</b><br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>2<br>current<br>0.9<br>9.2<br>20.3                    | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1<br>1.1<br>1.2.1<br>23.6                   | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2<br>1.1<br>11.2<br>24.2                     |
| 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<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 D7844<br>*ASTM D7844 | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>Imit/base</b><br>>25<br>>20<br><b>Imit/base</b><br>>6<br>>20<br>>30<br><b>Imit/base</b>                                       | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>current<br>0.9<br>9.2<br>20.3<br>current              | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1<br>1.1<br>12.1<br>23.6<br>history1        | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2<br>1.1<br>11.2<br>24.2<br>history2         |
| 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<br>FLUID DEGRAI<br>Oxidation | 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 D7844<br>*ASTM D7415                               | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>Iimit/base</b><br>>25<br><b>Iimit/base</b><br>>6<br>>20<br><b>Iimit/base</b><br>30  | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>2<br>current<br>0.9<br>9.2<br>20.3<br>current<br>15.6 | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1<br>1.2<br>1.2<br>23.6<br>history1<br>21.8 | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2<br>1.1<br>11.2<br>24.2<br>history2<br>21.3 |
| 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 D7844<br>*ASTM D7844 | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>Imit/base</b><br>>25<br>>20<br><b>Imit/base</b><br>>6<br>>20<br>>30<br><b>Imit/base</b>                                       | 0<br>0<br>64<br>1<br>1039<br>1196<br>1079<br>1337<br>3241<br>current<br>5<br>4<br>2<br>current<br>0.9<br>9.2<br>20.3<br>current              | 0<br>0<br>57<br><1<br>1037<br>1174<br>990<br>1311<br>2621<br>history1<br>13<br>7<br>0<br>history1<br>1.1<br>1.1<br>12.1<br>23.6<br>history1        | 1<br>2<br>60<br><1<br>879<br>1048<br>930<br>1200<br>3734<br>history2<br>10<br>36<br>5<br>history2<br>1.1<br>11.2<br>24.2<br>history2         |

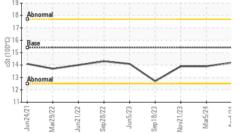


# **OIL ANALYSIS REPORT**







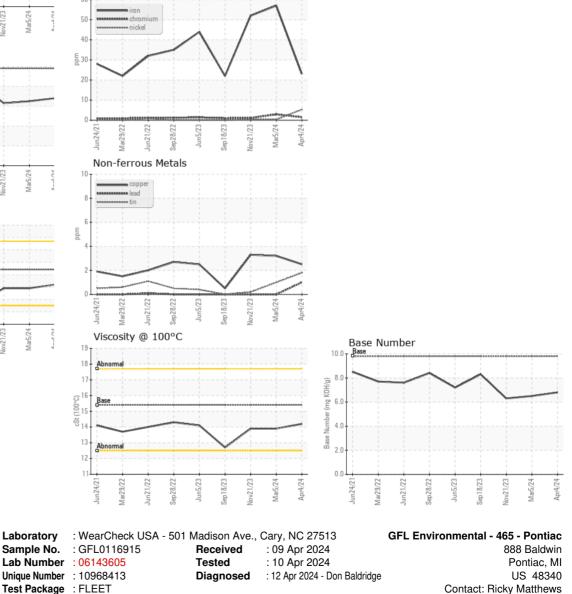


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| VICLAI           |        | ing a the stall | live it //e e e e |         | la la tanun d | history O |
|------------------|--------|-----------------|-------------------|---------|---------------|-----------|
| VISUAL           |        | method          | 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 PROPE      | RTIES  | method          | limit/base        | current | history1      | history2  |
| Visc @ 100°C     | cSt    | ASTM D445       | 15.4              | 14.2    | 13.9          | 13.9      |
| GRAPHS           |        |                 |                   |         |               |           |
| 🔺 Ferrous Alloys |        |                 |                   |         |               |           |



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)

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Certificate 12367

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