

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



2339 MACK GRANITE Diesel Engine

PETRO CANADA DURON SHP 15W40 (60 QTS)

...... SAMPLE INFORMATION method



DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: This vehicle is a requested re-sample.)

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

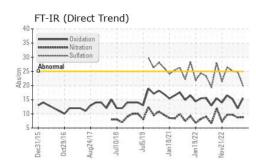
Fluid Condition

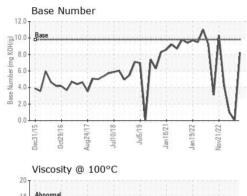
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

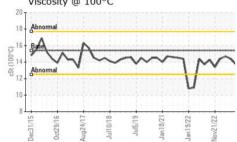
| SAMPLE INFORI | | method | limit/base | current | history1 | history2 |
|---|--|---|---|--|--|--|
| Sample Number | | Client Info | | GFL0117447 | GFL0103213 | GFL0089359 |
| Sample Date | | Client Info | | 15 Apr 2024 | 14 Dec 2023 | 14 Aug 2023 |
| Machine Age | hrs | Client Info | | 44450 | 43696 | 43085 |
| Oil Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | ABNORMAL | ABNORMAL |
| | | | 12 | | | |
| 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 |
| | | | | | | 44 |
| Iron | ppm | ASTM D5185m | >120 | 22 | 37 | 44 |
| Chromium | ppm | ASTM D5185m | >20 | <1 | <1 | |
| Nickel | ppm | ASTM D5185m | >5 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 5 | 1 | 1 |
| Lead | ppm | ASTM D5185m | >40 | 0 | 0 | 2 |
| Copper | ppm | ASTM D5185m | >330 | 0 | 4 | 3 |
| Tin | ppm | ASTM D5185m | >15 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base | current 2 | history1 3 | history2 <1 |
| | ppm ppm | | | | | |
| Boron | | ASTM D5185m | 0 | 2 | 3 | <1 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 | 2 0 | 3 0 | <1 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 | 2 0 59 | 3 0 53 | <1 0 57 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 | 2 0 59 0 | 3 0 53 <1 | <1 0 57 <1 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 0 0 60 0 1010 | 2 0 59 0 959 | 3 0 53 <1 885 | <1 0 57 <1 931 |
| 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 | 2 0 59 0 959 1071 | 3 0 53 <1 885 991 | <1 0 57 <1 931 1085 |
| 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 | 2 0 59 0 959 1071 1046 | 3 0 53 <1 885 991 909 | <1 0 57 <1 931 1085 975 |
| 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 | 2 0 59 0 959 1071 1046 1258 | 3 0 53 <1 885 991 909 1174 | <1 0 57 <1 931 1085 975 1200 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur | 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 | 2 0 59 0 959 1071 1046 1258 3329 | 3 0 53 <1 885 991 909 1174 2725 | <1 0 57 <1 931 1085 975 1200 3394 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN | 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 | 0 0 60 0 1010 1070 1150 1270 2060 | 2 0 59 0 959 1071 1046 1258 3329 current | 3 0 53 <1 885 991 909 1174 2725 history1 | <1 0 57 <1 931 1085 975 1200 3394 history2 |
| 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 0 1010 1070 1150 1270 2060 limit/base | 2 0 59 0 959 1071 1046 1258 3329 current | 3 0 53 <1 885 991 909 1174 2725 history1 3 | <1 0 57 <1 931 1085 975 1200 3394 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 ASTM D5185m ASTM D5185m | 0 0 60 0 1010 1070 1150 1270 2060 limit/base | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 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 ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 >25 | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 3 3 2 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 history1 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 3 |
| 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 | 0 0 0 1010 1070 1150 1270 2060 2060 225 >25 >20 Limit/base >20 | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 3 3 current 1 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 history1 3.9 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 3 history2 3.9 |
| 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 TS ppm ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 >25 >20 imit/base >20 | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 3 3 current 1 8.8 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 5 10 5 8.7 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 history2 3.9 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 ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 20 20 20 20 20 20 20 20 20 20 20 20 | 2 0 59 0 959 1071 1046 1258 3329 <u>current</u> 5 2 3 3 <u>current</u> 1 8.8 20.0 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 * history1 3.9 8.7 24.8 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 history2 3.9 9.7 25.1 |
| 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 2060 225 >25 >20 imit/base >20 | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 3 3 current 1 8.8 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 5 10 5 8.7 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 history2 3.9 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 ppm ppm | ASTM D5185m ASTM D5185m | 0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 20 20 20 20 20 20 20 20 20 20 20 20 | 2 0 59 0 959 1071 1046 1258 3329 <u>current</u> 5 2 3 3 <u>current</u> 1 8.8 20.0 | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 * history1 3.9 8.7 24.8 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 history2 3.9 9.7 25.1 |
| 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 D7844 *ASTM D7844 | 0 0 0 1010 1070 1150 1270 2060 2060 225 220 220 220 220 20 20 20 20 20 20 20 20 | 2 0 59 0 959 1071 1046 1258 3329 current 5 2 3 3 current 1 8.8 20.0 current | 3 0 53 <1 885 991 909 1174 2725 history1 3 0 <1 5 history1 3.9 8.7 24.8 history1 | <1 0 57 <1 931 1085 975 1200 3394 history2 4 2 3 history2 3.9 9.7 25.1 history2 |



OIL ANALYSIS REPORT







| VISUAL | | method | | | | 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 | 13.7 | 14.4 | 14.7 |
| GRAPHS | | | | | | |

Ferrous Alloys

Non-ferrous Metals

250

19

18

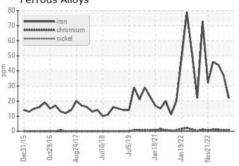
16

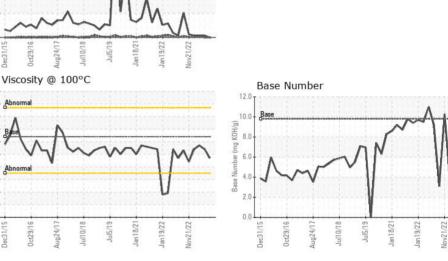
cSt (100°C)

11

10

0





Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 GFL Environmental - 001 - Raleigh(CNG) Sample No. : GFL0117447 Received : 17 Apr 2024 3741 Conquest Drive Lab Number : 06151689 Tested : 18 Apr 2024 Garner, NC Unique Number : 10981767 Diagnosed : 22 Apr 2024 - Jonathan Hester US 27529 Test Package : FLEET Contact: Craig Johnson Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. craig.johnson@gflenv.com T: (919)662-7100 * - 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) F: (919)662-7130

Report Id: GFL001 [WUSCAR] 06151689 (Generated: 04/22/2024 11:15:02) Rev: 1

Submitted By: aka Keith - Ronald Gregory

Page 2 of 2