

OIL ANALYSIS REPORT



Machine Id **4550** Component **Diesel Engine** Fluid **CITGO CITGUARD 600 15W40 (--- GAL)**

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

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 INFORM | IATION | method | limit/base | current | history1 | history2 |
|---|---|---|--|--|--|--|
| Sample Number | | Client Info | | WC0891582 | WC0891579 | |
| Sample Date | | Client Info | | 22 Mar 2024 | 04 Jan 2024 | |
| Machine Age | mls | Client Info | | 0 | 702829 | |
| Oil Age | mls | Client Info | | 18000 | 15000 | |
| Oil Changed | | Client Info | | Changed | Changed | |
| Sample Status | | | | NORMAL | NORMAL | |
| CONTAMINATION | ٧ | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <1.0 | <1.0 | |
| Water | | WC Method | >0.2 | NEG | NEG | |
| Glycol | | WC Method | | NEG | NEG | |
| WEAR METALS | | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >100 | 48 | 45 | |
| Chromium | ppm | ASTM D5185m | >20 | <1 | <1 | |
| Nickel | ppm | ASTM D5185m | >4 | 0 | 0 | |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | |
| Silver | ppm | ASTM D5185m | >3 | 0 | <1 | |
| Aluminum | ppm | ASTM D5185m | >20 | 2 | 3 | |
| Lead | ppm | ASTM D5185m | >40 | 23 | 20 | |
| Copper | ppm | ASTM D5185m | >330 | 2 | 2 | |
| Tin | ppm | ASTM D5185m | >15 | 0 | <1 | |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base 13 | current 34 | history1 50 | history2 |
| | ppm ppm | | | | | |
| Boron | | ASTM D5185m | 13 | 34 | 50 | |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 13 0 | 34 0 | 50 0 | |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 13 0 | 34 0 84 | 50 0 82 | |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 13 0 57 | 34 0 84 <1 | 50 0 82 <1 | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 13 0 57 825 | 34 0 84 <1 529 | 50 0 82 <1 473 2119 1323 | |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 13 0 57 825 1100 | 34 0 84 <1 529 2428 | 50 0 82 <1 473 2119 | |
| 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 | 13 0 57 825 1100 933 | 34 0 84 <1 529 2428 1345 | 50 0 82 <1 473 2119 1323 | |
| 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 | 13 0 57 825 1100 933 1089 | 34 0 84 <1 529 2428 1345 1602 | 50 0 82 <1 473 2119 1323 1643 | |
| 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 | 13 0 57 825 1100 933 1089 2769 limit/base | 34 0 84 <1 529 2428 1345 1602 4328 | 50 0 82 <1 473 2119 1323 1643 3782 | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 13 0 57 825 1100 933 1089 2769 limit/base | 34 0 84 <1 529 2428 1345 1602 4328 current | 50 0 82 <1 473 2119 1323 1643 3782 history1 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon | 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 | 13 0 57 825 1100 933 1089 2769 2769 2769 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium | 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 ASTM D5185m | 13 0 57 825 1100 933 1089 2769 2769 2769 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 4 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 13 0 57 825 1100 933 1089 2769 2769 2769 225 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 2 3 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 13 0 57 825 1100 933 1089 2769 2769 2769 225 >20 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 9 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1 | history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 13 0 57 825 1100 933 1089 2769 2769 2769 225 >20 20 1imit/base >20 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 <u>current</u> 1.3 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1 1.4 | history2 history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | 13 0 57 825 1100 933 1089 2769 2769 2769 2769 225 20 imit/base >20 | 34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 current 1.3 12.3 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 history1 1.4 1.4 11.7 | history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415 | 13 0 57 825 1100 933 1089 2769 2769 2769 225 20 220 320 33 220 330 | 34 0 84 <1 529 2428 1345 1602 4328 <u>current</u> 7 4 9 <u>current</u> 1.3 12.3 29.7 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1 1.4 1.7 28.6 | history2 history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS 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 | 13 0 57 825 1100 933 1089 2769 2769 2769 225 20 220 220 20 33 20 20 30 20 30 | 34 0 84 <1 529 2428 1345 1602 4328 <i>current</i> 7 4 9 <i>current</i> 1.3 12.3 29.7 | 50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 history1 1.4 11.7 28.6 history1 | history2 history2 history2 history2 |



OIL ANALYSIS REPORT

| 40 35 30 5 25 20 4 0 20 4 0 20 4 0 20 4 0 20 20 20 20 20 20 20 20 20 20 20 20 2 | | White Metal | scalar | *\/iouol | NONE | NONE | | |
|--|---|---------------------|-------------------------|----------------------------------|---|-------------|---|---|
| 30 Sulfation Sulfation | | | | visuai | INDINE | NONE | NONE | |
| Abnormal | Non-the-statement of the | Yellow Metal | scalar | *Visual | NONE | NONE | NONE | |
| | | Precipitate | scalar | *Visual | NONE | NONE | NONE | |
| /11+ | | Silt | scalar | *Visual | NONE | NONE | NONE | |
| 15- | | Debris | scalar | *Visual | NONE | NONE | NONE | |
| | | Sand/Dirt | | *Visual | NONE | NONE | NONE | |
| Jan 4/24 - | 2/24 - | Appearance | scalar | *Visual | NORML | NORML | NORML | |
| Jan | Mar22/24 | Odor | scalar | *Visual | NORML | NORML | NORML | |
| Da ao Numbran | | Emulsified Water | scalar | *Visual | >0.2 | NEG | NEG | |
| Base Number | | Free Water | scalar | *Visual | | NEG | NEG | |
| (10.0 | | FLUID PROPER | TIES | method | limit/base | current | history1 | history2 |
| × 8.0 E 6.0 | | Visc @ 100°C | cSt | ASTM D445 | 15.4 | 14.2 | 14.2 | |
| a 6.0 qm V 4.0 | | GRAPHS | | | | | | |
| 2.0 - | | Ferrous Alloys | | | | | | |
| 0.0 | | 50 iron | | | | | | |
| Jan 4,24 | 1000 | 40 - nickel | | | | | | |
| | - P.I | | | | | | | |
| Viscosity @ 100°C | | 30 | | | | | | |
| 19 | | 20 | | | | | | |
| 18 + Abnormal 17 - | | | | | | | | |
| © 16 Base 0 15 | | 10- | | | | | | |
| 0 15 | | | | | | | | |
| 13 - Abnormal | | Jan 4/24 | | | Mar22/2 ⁴ | | | |
| 12 | | | | | W | | | |
| | ve | Non-ferrous Meta | IS | | | | | |
| Jan4/24 | сс~и | copper | | | | | | |
| | *1 | 20 - tin | | | | | | |
| | | 15- | | | | | | |
| | | Edd | | | | | | |
| | | 10 | | | | | | |
| | | 5- | | | | | | |
| | | | | | | | | |
| | | an4/24 | | | 2/24 - | | | |
| | | Jan | | | Mar2 | | | |
| | | Viscosity @ 100° | C | | | Base Number | | |
| | | 19 | | | 12.0 | | | |
| | | 18 - Abnormal | | | 10.0 | <u> </u> | | |
| | | 17 | | | (B/HO) 8.0 | | | |
| | | 3 16 - Base 0 15 | | | (B) | | _ | |
| | | 73 14 - | | | a 6.0 | | | |
| | | 13 | | | ≥ 4.0 ase g | | | |
| | | Abnormal | | | 2.0 | | | |
| | | 11 | | | | | | |
| | | Jan4/24 | | | Mar22/24 | Jan4/24 | | Mar22/24 |
| | | | | | Mai | ٦ و | | Mai |
| Certificate 12367 | Sample No. : Lab Number : Unique Number : Test Package : s sample report, c | 10954968 | Recei Teste Diagr | ved : 01 d : 02 nosed : 04 | Apr 2024 2 Apr 2024 Apr 2024 - Se 9. | an Felton | JOHN Contact: BR prandon.irish@or | 00 RAVINE DR SON CITY, TN US 37601 ANDON IRISH |

Report Id: OMNJOH [WUSCAR] 06135503 (Generated: 04/05/2024 00:52:14) Rev: 1

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