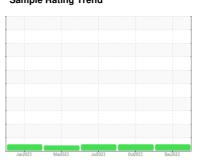


OIL ANALYSIS REPORT

Sample Rating Trend







Machine Id F20 Component

Diesel Engine

DIESEL ENGINE OIL SAE 15W40 (--- GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

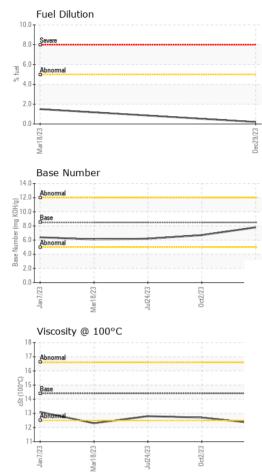
Fluid Condition

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

| | | Jan 2023 | Mar2023 | Jul2023 Oct2023 | Dec2023 | |
|--|--|--|--|---|--|--|
| SAMPLE INFORM | MATION | method | limit/base | current | history1 | history2 |
| Sample Number | | Client Info | | WC0874280 | WC0784023 | WC0758921 |
| Sample Date | | Client Info | | 29 Dec 2023 | 02 Oct 2023 | 24 Jul 2023 |
| Machine Age | mls | Client Info | | 110028 | 8672 | 8006 |
| Oil Age | mls | Client Info | | 0 | 666 | 831 |
| Oil Changed | | Client Info | | N/A | Changed | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| CONTAMINATIO | V | method | limit/base | current | history1 | history2 |
| Water | | WC Method | >0.2 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| WEAR METALS | | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >110 | 10 | 12 | 12 |
| Chromium | ppm | ASTM D5185m | >4 | <1 | 1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | 0 | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | <1 | 0 | <1 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >25 | 2 | 2 | 3 |
| Lead | ppm | ASTM D5185m | >45 | <1 | 3 | 2 |
| Copper | ppm | ASTM D5185m | >85 | 2 | 4 | 4 |
| Tin | ppm | ASTM D5185m | >4 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | <1 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base | current 12 | history1 | history2 24 |
| | ppm | | | | • | • |
| Boron | | ASTM D5185m | 250 | 12 | 7 | 24 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 250 10 | 12 0 | 7 | 24 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 | 12 0 63 | 7 0 76 | 24 0 68 |
| Boron Barium Molybdenum Manganese | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 | 12 0 63 <1 | 7 0 76 <1 | 24 0 68 <1 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 450 | 12 0 63 <1 896 | 7 0 76 <1 736 | 24 0 68 <1 350 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 450 3000 | 12 0 63 <1 896 1187 1101 | 7 0 76 <1 736 1370 | 24 0 68 <1 350 2009 |
| 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 ASTM D5185m | 250 10 100 450 3000 1150 | 12 0 63 <1 896 1187 1101 | 7 0 76 <1 736 1370 1023 | 24 0 68 <1 350 2009 949 |
| 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 ASTM D5185m | 250 10 100 450 3000 1150 | 12 0 63 <1 896 1187 1101 | 7 0 76 <1 736 1370 1023 1295 | 24 0 68 <1 350 2009 949 1164 |
| 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 ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base | 12 0 63 <1 896 1187 1101 1232 2962 | 7 0 76 <1 736 1370 1023 1295 3284 | 24 0 68 <1 350 2009 949 1164 3852 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 | 12 0 63 <1 896 1187 1101 1232 2962 current | 7 0 76 <1 736 1370 1023 1295 3284 history1 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 | 24 0 68 <1 350 2009 949 1164 3852 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium | ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 | 7 0 76 <1 736 1370 1023 1295 3284 history1 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 3 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 history1 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 <1.0 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 limit/base >3 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 current 0.3 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 history1 0.4 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 <1.0 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 limit/base | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 current 0.3 7.9 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 history1 0.4 9.1 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 <1.0 history2 0.4 10.7 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7624 *ASTM D76145 | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 limit/base >3 >20 >30 | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 current 0.3 7.9 19.1 | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 history1 0.4 9.1 20.5 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 <1.0 history2 0.4 10.7 21.5 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA | ppm | ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7624 *ASTM D7844 | 250 10 100 450 3000 1150 1350 4250 limit/base >30 >158 >20 >5 limit/base >3 >20 >30 limit/base | 12 0 63 <1 896 1187 1101 1232 2962 current 7 4 3 0.2 current 0.3 7.9 19.1 current | 7 0 76 <1 736 1370 1023 1295 3284 history1 8 1 5 <1.0 history1 0.4 9.1 20.5 history1 | 24 0 68 <1 350 2009 949 1164 3852 history2 5 3 <1.0 history2 0.4 10.7 21.5 history2 |



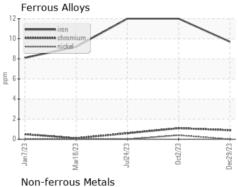
OIL ANALYSIS REPORT



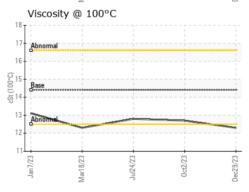
| VISUAL | | method | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|-------------|---------|----------|----------|
| VIOUNE | | memou | IIIIII/Dasc | Carrent | Thistory | Historyz |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | 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 | TIEC | method | limit/hase | current | history1 | history2 |

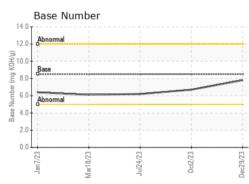
| FLUID PROPERTIES | | metnoa | ilmit/base | current | nistory i | nistory2 |
|------------------|-----|-----------|------------|---------|-----------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 12.3 | 12.7 | 12.8 |

GRAPHS



| 35 T | | | | |
|----------|----------|----------|--------|----------|
| 30- | | | | |
| 25 - | • tin | | | |
| E 20 | | | | |
| 10 | \ | | | |
| 5 | | | | |
| 0 | | | CO. | |
| Jan 7/23 | Mar18/23 | Jul24/2: | 0ct2/2 |)ec29/23 |









Laboratory Sample No. Lab Number **Unique Number**

: WC0874280 : 06060549 : 10831931

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Recieved

: 16 Jan 2024 Diagnosed

: 18 Jan 2024 Diagnostician : Wes Davis

Egg Harbor Township, NJ

US 08234 Contact: Service Manager

Apple Valley Waste - EHT Location

Test Package : CONST (Additional Tests: FuelDilution, PercentFuel, TBN) 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)

T: F:

6626 Delilah Road