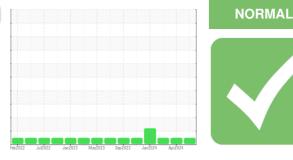


OIL ANALYSIS REPORT

SAMPLE INFORMATION metho

Sample Rating Trend



Machine Id **1713** Component **Diesel Engine** Fluid **DIESEL ENGINE OIL SAE 15W40 (--- GAL)**

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample. Please specify the brand, type, and viscosity of the oil on your next sample.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

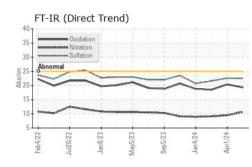
Fluid Condition

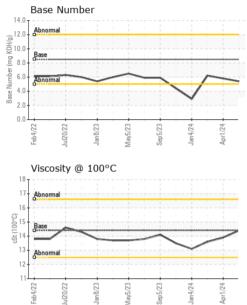
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| SAMPLE INFORM | ATION | method | limit/base | current | history i | nistory2 |
|---|--|--|---|---|--|---|
| Sample Number | | Client Info | | WC0887561 | HRE0000130 | WC0887622 |
| Sample Date | | Client Info | | 22 May 2024 | 01 Apr 2024 | 15 Feb 2024 |
| Machine Age | mls | Client Info | | 0 | 231568 | 0 |
| Oil Age | mls | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | Changed | N/A | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| Sample Status | | | | NORMAL | NORIVIAL | NORMAL |
| CONTAMINATIO | N | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <1.0 | <1.0 | <1.0 |
| 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 | >100 | 8 | 11 | 10 |
| Chromium | ppm | ASTM D5185m | >20 | 0 | 0 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | <1 | 1 | <1 |
| Silver | ppm | ASTM D5185m | >3 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | | 3 | 4 | 2 |
| Lead | | ASTM D5185m | >40 | 0 | -1 | 1 |
| | ppm | ASTM D5185m | | 3 | 17 | 12 |
| Copper | ppm | | | - | | |
| Tin | ppm | ASTM D5185m | >15 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base 250 | current 30 | history1 93 | history2 56 |
| | ppm ppm | | | | | |
| Boron | | ASTM D5185m | 250 | 30 | 93 | 56 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | 250 10 | 30 0 | 93 0 | 56 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 | 30 0 85 | 93 0 69 | 56 0 69 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 | 30 0 85 <1 | 93 0 69 <1 | 56 0 69 0 |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 450 | 30 0 85 <1 147 | 93 0 69 <1 371 | 56 0 69 0 400 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 450 3000 1150 | 30 0 85 <1 147 2120 1068 | 93 0 69 <1 371 1527 956 | 56 0 69 0 400 1689 1019 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | 250 10 100 450 3000 | 30 0 85 <1 147 2120 | 93 0 69 <1 371 1527 | 56 0 69 0 400 1689 |
| 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 | 250 10 100 450 3000 1150 1350 4250 | 30 0 85 <1 147 2120 1068 1256 3950 | 93 0 69 <1 371 1527 956 1153 3487 | 56 0 69 0 400 1689 1019 1255 3217 |
| 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 ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 | 30 0 85 <1 147 2120 1068 1256 3950 current | 93 0 69 <1 371 1527 956 1153 3487 history1 | 56 0 69 0 400 1689 1019 1255 3217 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 method | 250 10 100 450 3000 1150 1350 4250 imit/base | 30 0 85 <1 147 2120 1068 1256 3950 current 10 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 |
| 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 | 250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 | 30 0 85 <1 147 2120 1068 1256 3950 current 10 5 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 |
| 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 method | 250 10 100 450 3000 1150 1350 4250 imit/base | 30 0 85 <1 147 2120 1068 1256 3950 current 10 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 |
| 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 | 250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 | 30 0 85 <1 147 2120 1068 1256 3950 current 10 5 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 |
| 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 | 250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 | 30 0 85 <1 147 2120 1068 1256 3950 current 10 5 <1 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 |
| 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 | 250 10 100 450 3000 1150 1350 4250 Imit/base >25 >158 >20 Imit/base >3 | 30 0 85 <1 147 2120 1068 1256 3950 current 10 5 <1 current | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 2 history1 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 0 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 | ASTM D5185m ASTM D5185m | 250 10 100 450 3000 1150 1350 4250 Imit/base >25 >158 >20 Imit/base >3 | 30 0 85 <1 147 2120 1068 1256 3950 <i>current</i> 10 5 <1 <i>current</i> 0.4 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 2 history1 0.4 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 0 history2 0.4 |
| 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 | 250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20 | 30 0 85 <1 147 2120 1068 1256 3950 <i>current</i> 10 5 <1 <i>current</i> 0.4 10.7 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 history1 0.4 9.5 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 0 history2 0.4 9.1 |
| 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 | 250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20 >30 | 30 0 85 <1 147 2120 1068 1256 3950 current 10 5 <1 current 0.4 10.7 22.5 current | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 history1 0.4 9.5 22.6 history1 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 0 history2 0.4 9.1 21.6 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 D5185m | 250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20 >30 imit/base | 30 0 85 <1 147 2120 1068 1256 3950 <u>current</u> 10 5 <1 0.4 10.7 22.5 | 93 0 69 <1 371 1527 956 1153 3487 history1 8 6 2 history1 0.4 9.5 22.6 | 56 0 69 0 400 1689 1019 1255 3217 history2 9 4 0 0 history2 0.4 9.1 21.6 |

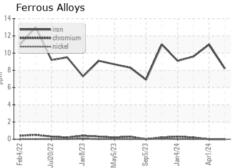


OIL ANALYSIS REPORT

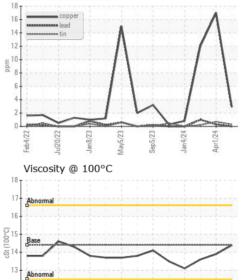


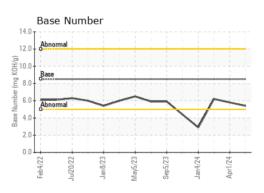


| VISUAL | | method | limit/base | current | history1 | history2 |
|------------------|--------|-----------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Precipitate | scalar | *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 PROPERT | IES | method | limit/base | current | history1 | history2 |
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 14.4 | 13.9 | 13.6 |
| GRAPHS | | | | | | |









TOWN OF CHAPEL HILL Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : WC0887561 Received 6900 MILLHOUSE RD : 31 May 2024 Lab Number : 06196210 Tested : 03 Jun 2024 CHAPEL HILL, NC Unique Number : 11058333 Diagnosed : 03 Jun 2024 - Wes Davis US 27516 Test Package : FLEET Contact: Lisa DePasqua Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. ldepasqua@townofchapelhill.org * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (919)696-4941 F:

/lav5/23

lan8/23

Sep5/23 -

lan4/24

Apr1/24 -

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

12

11

Feb4/22

Report Id: TOWCHANC [WUSCAR] 06196210 (Generated: 06/03/2024 09:22:13) Rev: 1

Contact/Location: Lisa DePasqua - TOWCHANC