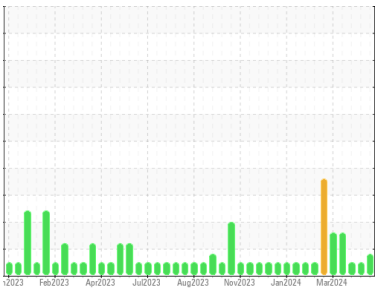
# OIL ANALYSIS REPORT

Sample Rating Trend



**WEAR**

Machine Id
## Grand Blanc CAT 3 GBLM03BE
Component
**Biogas Engine**
Fluid
**CHEVRON HDAX 9500 GAS ENGINE OIL 40 (--- GAL)**

## DIAGNOSIS

**Recommendation**
No corrective action is recommended at this time. Resample at the next service interval to monitor. ( Customer Sample Comment: 400hr Oil Sample )

**Wear**
The copper level is abnormal. 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 AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0905698** | WC0905754 | WC0905737 |
| Sample Date | | Client Info | | **18 Apr 2024** | 10 Apr 2024 | 25 Mar 2024 |
| Machine Age | hrs | Client Info | | **82982** | 82825 | 82525 |
| Oil Age | hrs | Client Info | | **413** | 0 | 895 |
| Oil Changed | | Client Info | | **Not Changd** | N/A | Not Changd |
| Sample Status | | | | **ABNORMAL** | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >4.0 | **<1.0** | <1.0 | <1.0 |
| Water | | WC Method | >.11 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >15 | **3** | 4 | 11 |
| Chromium | ppm | ASTM D5185m | >4 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | | **0** | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >6 | **1** | 2 | 2 |
| Lead | ppm | ASTM D5185m | >9 | **0** | 2 | 2 |
| Copper | ppm | ASTM D5185m | >6 | ▲ **6** | 5 | 12 |
| Tin | ppm | ASTM D5185m | >4 | **1** | 2 | 2 |
| Vanadium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | <1 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **7** | 4 | 9 |
| Barium | ppm | ASTM D5185m | | **1** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **4** | 4 | 5 |
| Manganese | ppm | ASTM D5185m | | **1** | 1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **16** | 9 | 11 |
| Calcium | ppm | ASTM D5185m | | **1947** | 1871 | 1817 |
| Phosphorus | ppm | ASTM D5185m | | **293** | 298 | 260 |
| Zinc | ppm | ASTM D5185m | | **371** | 350 | 331 |
| Sulfur | ppm | ASTM D5185m | | **3444** | 3328 | 3761 |

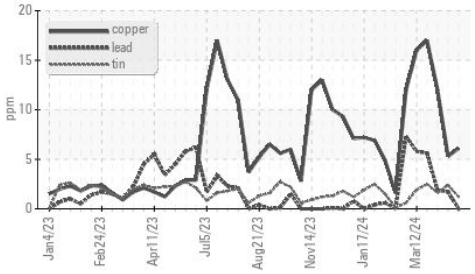
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >181 | **78** | 84 | 123 |
| Sodium | ppm | ASTM D5185m | >21 | **4** | 3 | 40 |
| Potassium | ppm | ASTM D5185m | >20 | **<1** | 3 | 0 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | | **0.1** | 0.1 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | | **5.9** | 6.1 | 6.7 |
| Sulfation | Abs/.1mm | *ASTM D7415 | | **20.4** | 21.6 | 25.2 |

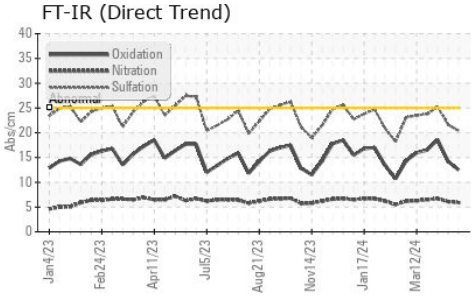
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | | **12.5** | 14.2 | 18.6 |
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 1.0 | **1.05** | 1.59 | 2.14 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 5.4 | **3.23** | 3.29 | 3.10 |

# OIL ANALYSIS REPORT

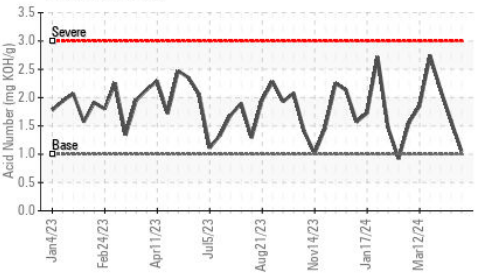
Non-ferrous Metals



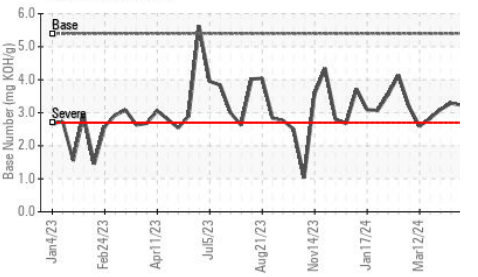

FT-IR (Direct Trend)



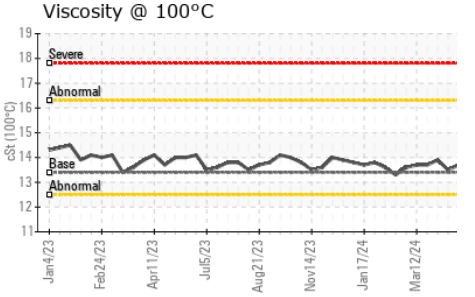

Acid Number




Base Number




Viscosity @ 100°C

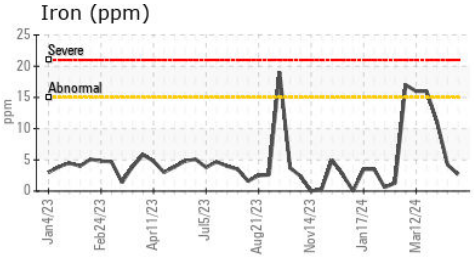



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **LIGHT** | LIGHT | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 | >.11 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

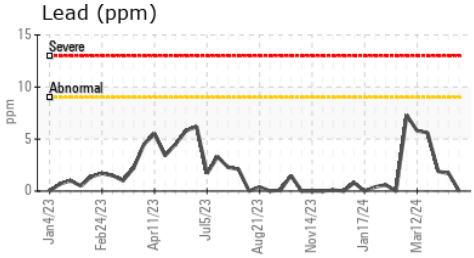
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 13.4 | **13.7** | 13.5 | 13.9 |

GRAPHS

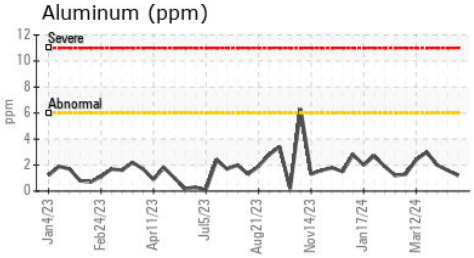
Iron (ppm)



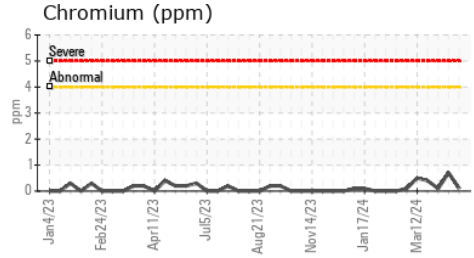

Lead (ppm)



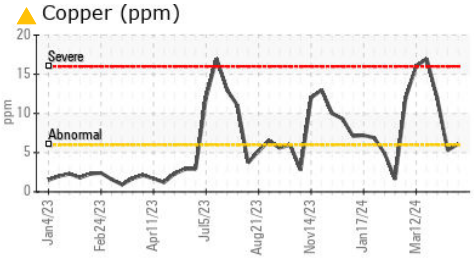

Aluminum (ppm)



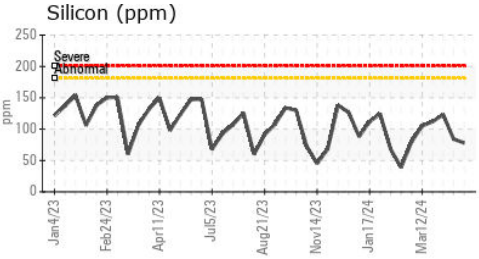

Chromium (ppm)



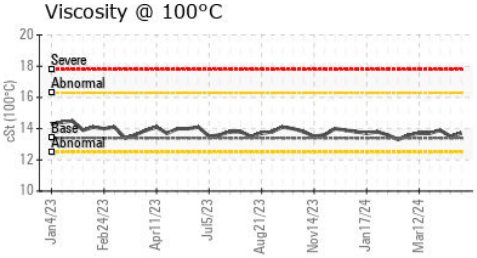

Copper (ppm)



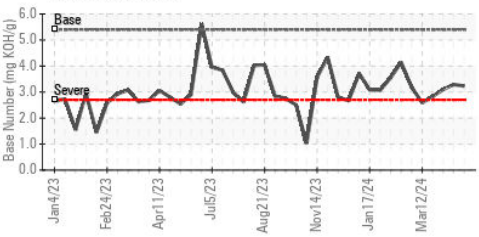

Silicon (ppm)




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0905698
**Lab Number** : 06156188
**Unique Number** : 10991611
**Test Package** : MOB 2

**Received** : 22 Apr 2024
**Tested** : 23 Apr 2024
**Diagnosed** : 24 Apr 2024 - Sean Felton

*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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Report Id: EDLGRA [WUSCAR] 06156188 (Generated: 04/24/2024 14:10:18) Rev: 1

Submitted By: DARREL HILTZ