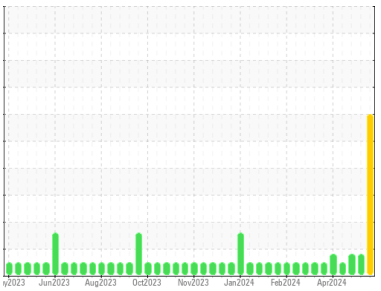
# OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Machine Id
## Coopersville CAT 4 CPVM04BE
Component
**Biogas Engine**
Fluid
**CHEVRON HDAX 9500 GAS ENGINE OIL 40 (105 GAL)**

## DIAGNOSIS

**▲ Recommendation**
We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

**▲ Wear**
The tin level is severe.

**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.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0871435** | WC0871427 | WC0871568 |
| Sample Date | | Client Info | | **15 Jul 2024** | 09 Jul 2024 | 26 Apr 2024 |
| Machine Age | hrs | Client Info | | **82133** | 81990 | 80272 |
| Oil Age | hrs | Client Info | | **428** | 285 | 692 |
| Oil Changed | | Client Info | | **Not Changd** | Not Changd | Not Changd |
| Sample Status | | | | **SEVERE** | ABNORMAL | ABNORMAL |

| 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 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184 | >21 | **12** | 16 | --- |
| Iron | ppm | ASTM D5185m | >15 | **4** | 3 | 2 |
| Chromium | ppm | ASTM D5185m | >4 | **<1** | <1 | 0 |
| Nickel | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | **<1** | <1 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >6 | **3** | 2 | 2 |
| Lead | ppm | ASTM D5185m | >9 | **<1** | <1 | 2 |
| Copper | ppm | ASTM D5185m | >6 | **2** | 3 | 1 |
| Tin | ppm | ASTM D5185m | >4 | ▲ **6** | ▲ 4 | ▲ 4 |
| Vanadium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **<1** | <1 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **84** | 105 | 3 |
| Barium | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **8** | 8 | 3 |
| Manganese | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Magnesium | ppm | ASTM D5185m | | **43** | 43 | 6 |
| Calcium | ppm | ASTM D5185m | | **1695** | 1657 | 1988 |
| Phosphorus | ppm | ASTM D5185m | | **438** | 463 | 289 |
| Zinc | ppm | ASTM D5185m | | **628** | 619 | 368 |
| Sulfur | ppm | ASTM D5185m | | **3449** | 3307 | 2463 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >181 | **149** | 109 | 143 |
| Sodium | ppm | ASTM D5185m | >21 | **0** | 0 | 2 |
| Potassium | ppm | ASTM D5185m | >20 | **2** | 2 | 2 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | | **0** | 0 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | | **5.0** | 4.7 | 7.8 |
| Sulfation | Abs/.1mm | *ASTM D7415 | | **19.3** | 18.4 | 21.2 |

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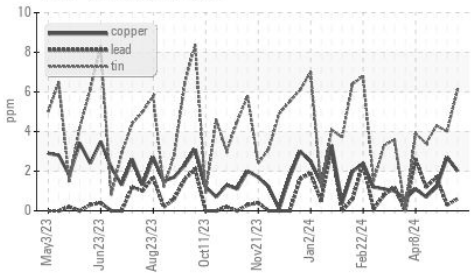
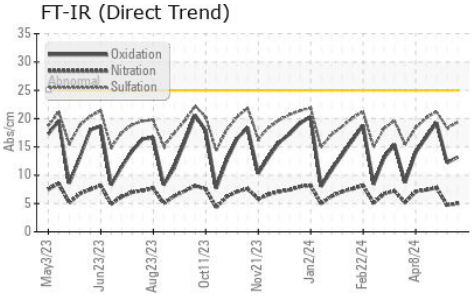
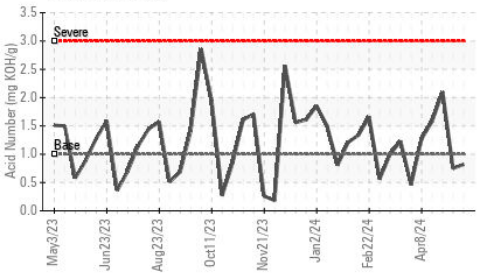
Non-ferrous Metals



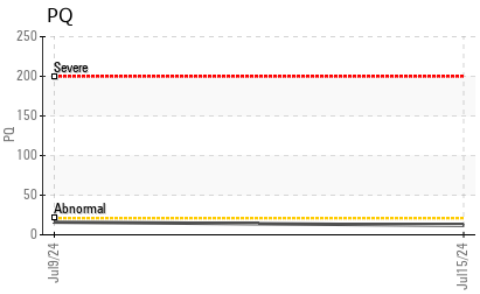

FT-IR (Direct Trend)



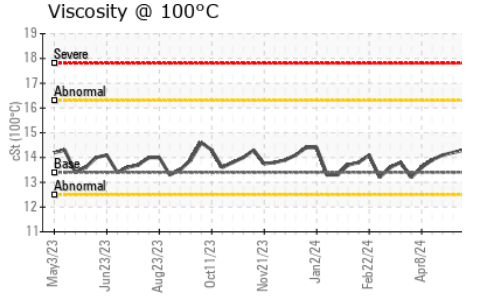

Acid Number




PQ




Viscosity @ 100°C



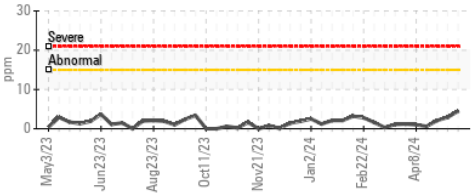

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | | **13.2** | 12.2 | 19.3 |
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 1.0 | **0.82** | 0.75 | 2.10 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 5.4 | **4.87** | 4.92 | 3.96 |

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

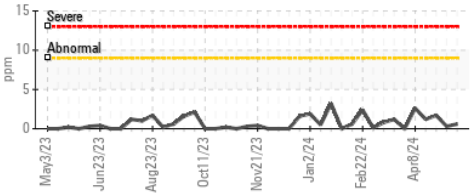
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 13.4 | **14.3** | 14.2 | 14.1 |

## GRAPHS

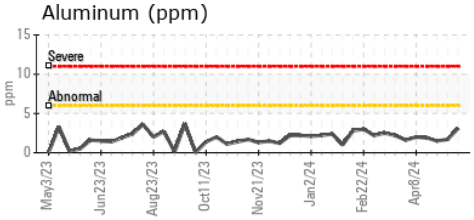
Iron (ppm)



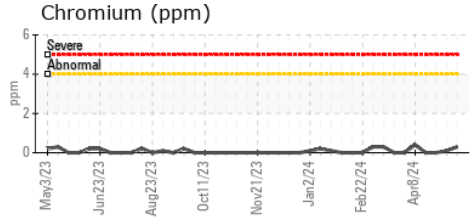

Lead (ppm)



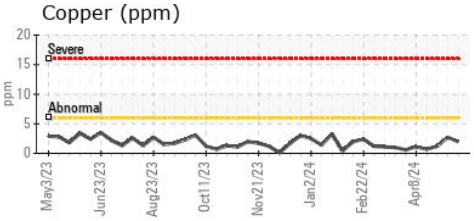

Aluminum (ppm)



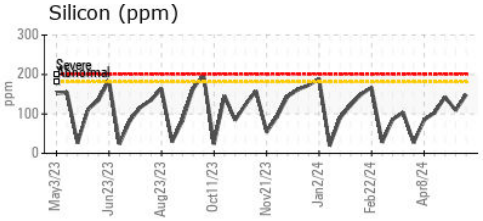

Chromium (ppm)



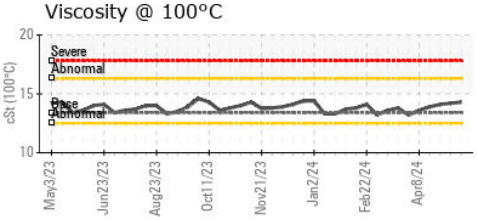

Copper (ppm)



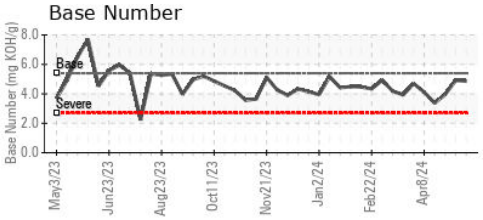

Silicon (ppm)




Viscosity @ 100°C




Base Number




ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY
Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0871435
**Lab Number** : 06239309
**Unique Number** : 11128143
**Test Package** : MOB 2 ( Additional Tests: PQ )

**Received** : 17 Jul 2024
**Tested** : 18 Jul 2024
**Diagnosed** : 19 Jul 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: EDLCOO [WUSCAR] 06239309 (Generated: 07/19/2024 12:00:39) Rev: 1

Submitted By: Chad Conroy