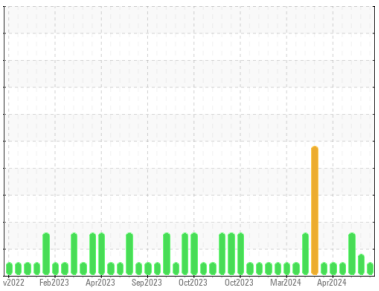
# OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Machine Id
**4EK05286**
Component
**Biogas Engine**
Fluid
**D-A Lubricant Blue Flame HB-8 40W (--- 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 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 | | **WC0880248** | WC0880247 | WC0880260 |
| Sample Date | | Client Info | | **24 Jun 2024** | 21 Jun 2024 | 06 May 2024 |
| Machine Age | hrs | Client Info | | **83226** | 83167 | 83159 |
| Oil Age | hrs | Client Info | | **67** | 8 | 420 |
| Oil Changed | | Client Info | | **Not Changd** | N/A | Not Changd |
| Sample Status | | | | **NORMAL** | ATTENTION | ABNORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >4.0 | **<1.0** | <1.0 | <1.0 |
| Water | | WC Method | >0.1 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >45 | **27** | 30 | 4 |
| Chromium | ppm | ASTM D5185m | >2 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | **2** | 1 | 0 |
| Titanium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Silver | ppm | ASTM D5185m | >5 | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >10 | **3** | 4 | 2 |
| Lead | ppm | ASTM D5185m | >5 | **0** | 2 | <1 |
| Copper | ppm | ASTM D5185m | >14 | **3** | 2 | 2 |
| Tin | ppm | ASTM D5185m | >13 | **<1** | 2 | 4 |
| 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 | | **<1** | 7 | 0 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Molybdenum | ppm | ASTM D5185m | | **<1** | 4 | 0 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **8** | 28 | 4 |
| Calcium | ppm | ASTM D5185m | | **2474** | 2492 | 2339 |
| Phosphorus | ppm | ASTM D5185m | | **343** | 347 | 393 |
| Zinc | ppm | ASTM D5185m | | **425** | 434 | 455 |
| Sulfur | ppm | ASTM D5185m | | **4319** | 3894 | 5150 |

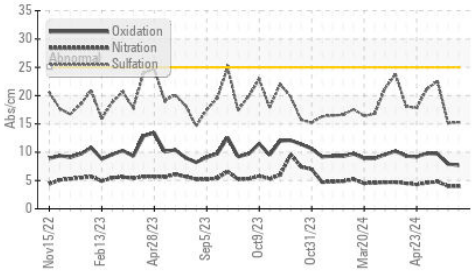
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >200 | **89** | 57 | ▲ 237 |
| Sodium | ppm | ASTM D5185m | | **3** | 2 | 0 |
| Potassium | ppm | ASTM D5185m | >20 | **1** | 3 | 0 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | | **0** | 0 | 0 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **4.0** | 4.0 | 4.8 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **15.3** | 15.1 | 22.6 |

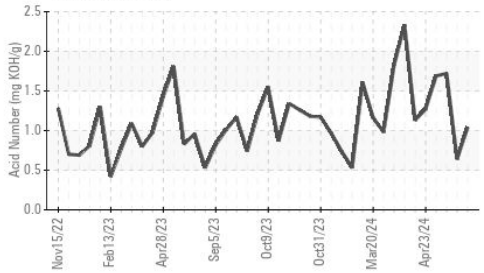
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **7.7** | 7.9 | 9.7 |
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **1.04** | 0.64 | 1.72 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 8 | **7.14** | 7.87 | 4.94 |

# OIL ANALYSIS REPORT

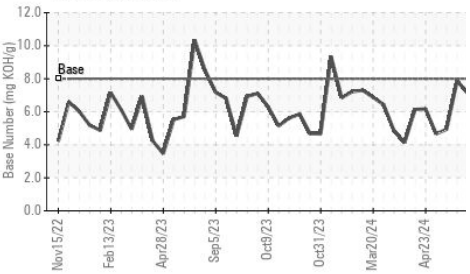
FT-IR (Direct Trend)



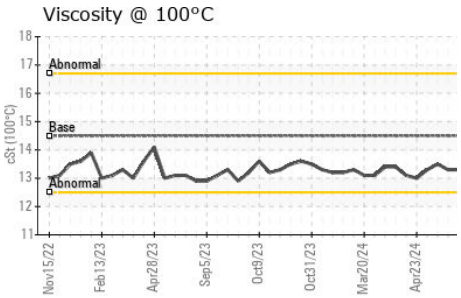

Acid Number




Base Number




Viscosity @ 100°C

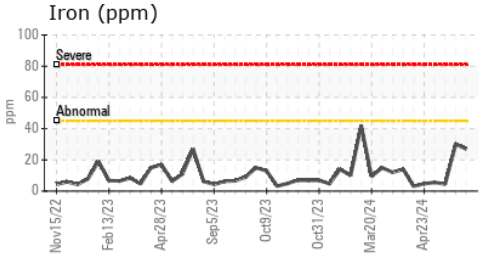



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 | >0.1 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

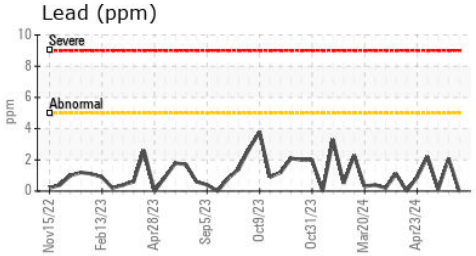
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 14.5 | **13.3** | 13.3 | 13.5 |

GRAPHS

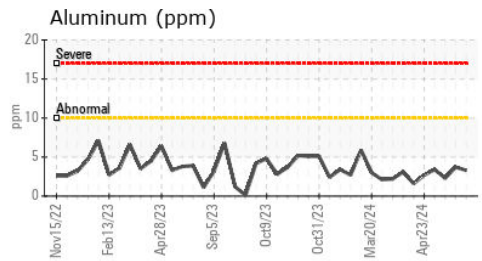
Iron (ppm)



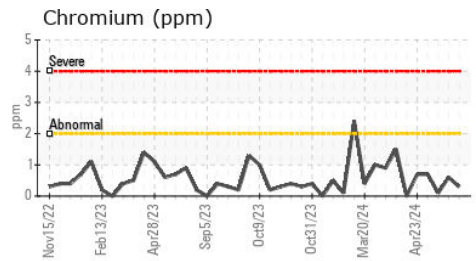

Lead (ppm)



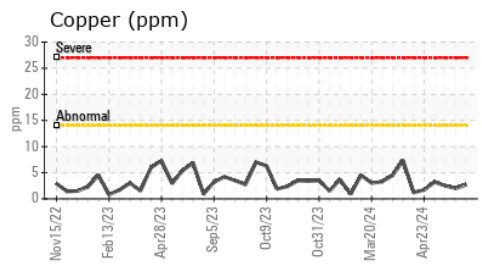

Aluminum (ppm)



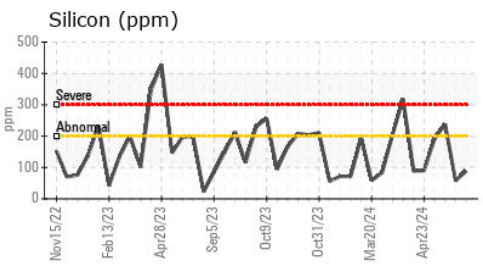

Chromium (ppm)



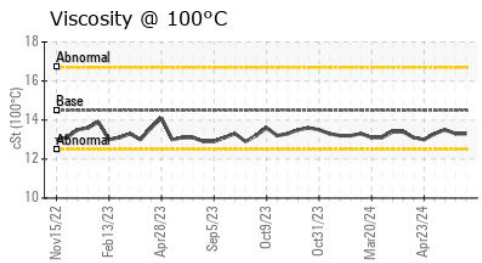

Copper (ppm)



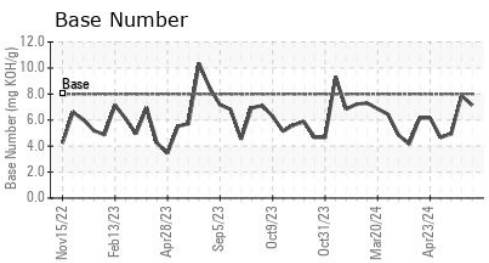

Silicon (ppm)




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0880248
**Lab Number** : 06219905
**Unique Number** : 11098102
**Test Package** : MOB 2

**Received** : 25 Jun 2024
**Tested** : 26 Jun 2024
**Diagnosed** : 26 Jun 2024 - Sean Felton

**BI-COUNTY**
3214 DOVER RD
WOODLAWN, TN
US 37191
Contact: KEVIN WEAVER
kevin.weaver@cubedistrictenergy.com
T:
F:

*To discuss this sample report, contact Customer Service at 1-800-237-1369.*
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*Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)*