



# OIL ANALYSIS REPORT

|                 |        |
|-----------------|--------|
| WEAR            | NORMAL |
| CONTAMINATION   | NORMAL |
| FLUID CONDITION | NORMAL |

Machine Id  
**LIEBHERR 31241**  
Component  
**Diesel Engine**  
Fluid  
**DIESEL ENGINE OIL 10W40 (10 GAL)**

## RECOMMENDATION

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

| Test           | UOM | Method      | Limit/Abn | Current            | History1    | History2    |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number  |     | Client Info |           | <b>WC0882633</b>   | WC0846385   | WC0786679   |
| Sample Date    |     | Client Info |           | <b>11 Jan 2024</b> | 15 Sep 2023 | 17 May 2023 |
| Machine Age    | hrs | Client Info |           | <b>6311</b>        | 5789        | 5357        |
| Oil Age        | hrs | Client Info |           | <b>250</b>         | 750         | 598         |
| Filter Age     | hrs | Client Info |           | <b>250</b>         | 750         | 598         |
| Oil Changed    |     | Client Info |           | <b>Changed</b>     | Changed     | Changed     |
| Filter Changed |     | Client Info |           | <b>Changed</b>     | Changed     | Changed     |
| Sample Status  |     |             |           | <b>NORMAL</b>      | NORMAL      | NORMAL      |

## WEAR

All component wear rates are normal.

|              |        |             |      |              |      |      |
|--------------|--------|-------------|------|--------------|------|------|
| Iron         | ppm    | ASTM D5185m | >100 | <b>6</b>     | 10   | 8    |
| Chromium     | ppm    | ASTM D5185m | >20  | <b>0</b>     | <1   | <1   |
| Nickel       | ppm    | ASTM D5185m | >4   | <b>0</b>     | 0    | <1   |
| Titanium     | ppm    | ASTM D5185m |      | <b>0</b>     | <1   | 0    |
| Silver       | ppm    | ASTM D5185m | >3   | <b>0</b>     | 0    | 0    |
| Aluminum     | ppm    | ASTM D5185m | >20  | <b>2</b>     | 2    | 3    |
| Lead         | ppm    | ASTM D5185m | >40  | <b>0</b>     | 0    | <1   |
| Copper       | ppm    | ASTM D5185m | >330 | <b>&lt;1</b> | <1   | 2    |
| Tin          | ppm    | ASTM D5185m | >15  | <b>0</b>     | 0    | <1   |
| Vanadium     | ppm    | ASTM D5185m |      | <b>&lt;1</b> | 0    | 0    |
| White Metal  | scalar | *Visual     | NONE | <b>NONE</b>  | NONE | NONE |
| Yellow Metal | scalar | *Visual     | NONE | <b>NONE</b>  | NONE | NONE |

## CONTAMINATION

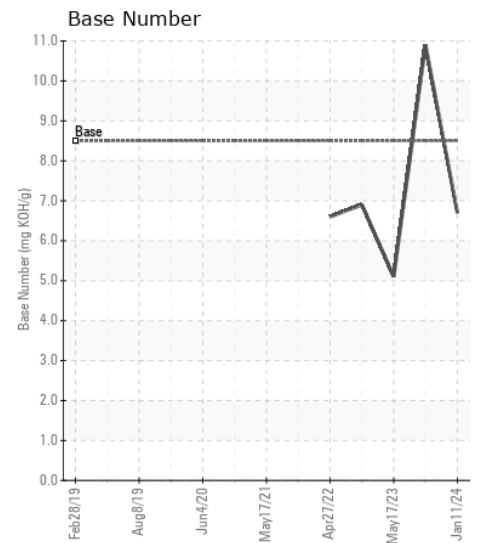
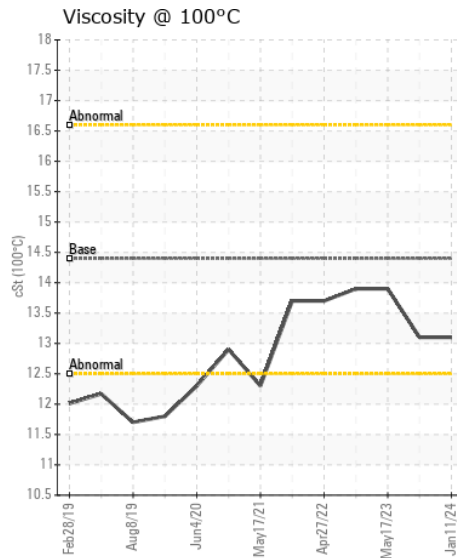
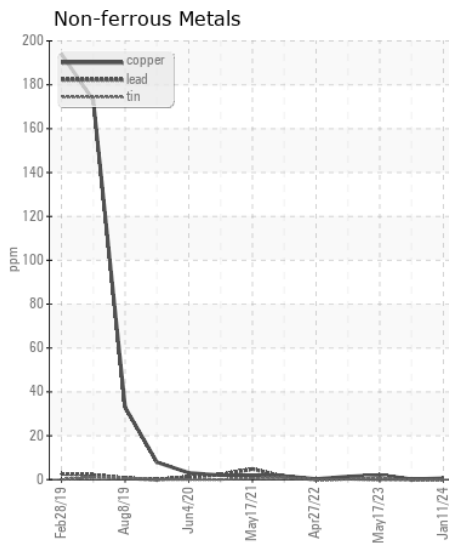
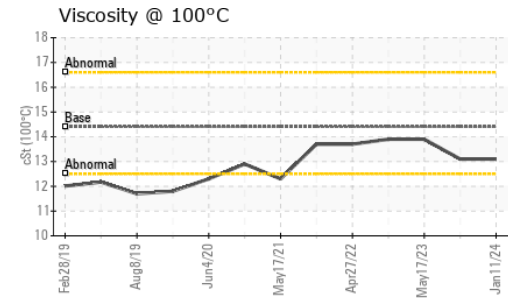
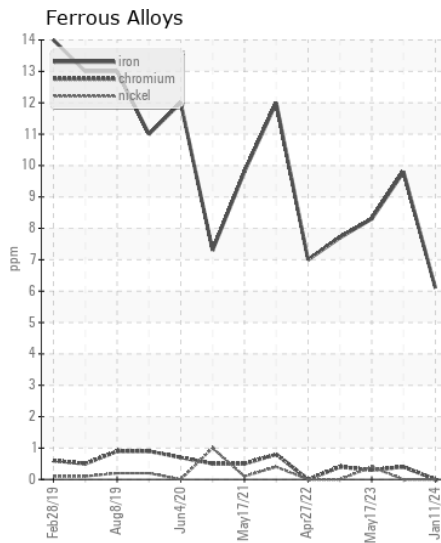
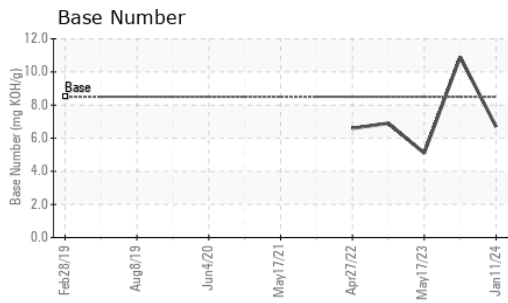
There is no indication of any contamination in the oil.

|                  |          |             |       |                |       |       |
|------------------|----------|-------------|-------|----------------|-------|-------|
| Silicon          | ppm      | ASTM D5185m | >25   | <b>7</b>       | 8     | 7     |
| Potassium        | ppm      | ASTM D5185m | >20   | <b>&lt;1</b>   | 1     | 5     |
| Fuel             |          | WC Method   | >5    | <b>&lt;1.0</b> | <1.0  | <1.0  |
| Water            |          | WC Method   | >0.2  | <b>NEG</b>     | NEG   | NEG   |
| Glycol           |          | WC Method   |       | <b>NEG</b>     | NEG   | NEG   |
| Soot %           | %        | *ASTM D7844 | >3    | <b>0.1</b>     | 0.1   | 0.1   |
| Nitration        | Abs/cm   | *ASTM D7624 | >20   | <b>12.0</b>    | 14.3  | 12.7  |
| Sulfation        | Abs/.1mm | *ASTM D7415 | >30   | <b>21.3</b>    | 19.1  | 24.3  |
| Silt             | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Debris           | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Sand/Dirt        | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Appearance       | scalar   | *Visual     | NORML | <b>NORML</b>   | NORML | NORML |
| Odor             | scalar   | *Visual     | NORML | <b>NORML</b>   | NORML | NORML |
| Emulsified Water | scalar   | *Visual     | >0.2  | <b>NEG</b>     | NEG   | NEG   |

## 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.

|                  |          |             |      |              |      |      |
|------------------|----------|-------------|------|--------------|------|------|
| Sodium           | ppm      | ASTM D5185m |      | <b>2</b>     | 5    | 1    |
| Boron            | ppm      | ASTM D5185m | 250  | <b>118</b>   | 203  | 49   |
| Barium           | ppm      | ASTM D5185m | 10   | <b>0</b>     | 0    | 0    |
| Molybdenum       | ppm      | ASTM D5185m | 100  | <b>2</b>     | 0    | <1   |
| Manganese        | ppm      | ASTM D5185m |      | <b>&lt;1</b> | <1   | <1   |
| Magnesium        | ppm      | ASTM D5185m | 450  | <b>650</b>   | 157  | 767  |
| Calcium          | ppm      | ASTM D5185m | 3000 | <b>1799</b>  | 4067 | 1330 |
| Phosphorus       | ppm      | ASTM D5185m | 1150 | <b>872</b>   | 998  | 734  |
| Zinc             | ppm      | ASTM D5185m | 1350 | <b>985</b>   | 1195 | 863  |
| Sulfur           | ppm      | ASTM D5185m | 4250 | <b>3634</b>  | 3528 | 2994 |
| Oxidation        | Abs/.1mm | *ASTM D7414 | >25  | <b>21.4</b>  | 14.7 | 26.9 |
| Base Number (BN) | mg KOH/g | ASTM D2896  | 8.5  | <b>6.7</b>   | 10.9 | 5.1  |
| Visc @ 100°C     | cSt      | ASTM D445   | 14.4 | <b>13.1</b>  | 13.1 | 13.9 |



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : WC0882633 **Received** : 16 Jan 2024  
**Lab Number** : 06060623 **Diagnosed** : 16 Jan 2024  
**Unique Number** : 10832005 **Diagnostician** : Wes Davis  
**Test Package** : CONST ( Additional Tests: TBN )

**SULLIVAN EASTERN INC-LIEBHERR**  
 2860 C SLATER RD  
 MORRISVILLE, NC  
 US 27560  
 Contact: CHRIS CALTON

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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