



LIEBHERR

OIL ANALYSIS REPORT

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



Machine Id
LIEBHERR R938 050294-1650
Component
Left Final Drive
Fluid
GEAR OIL SAE 75W90 (--- GAL)

RECOMMENDATION

We advise that you check for the source of water entry. We advise that you check all areas where dirt can enter the system. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

WEAR

Chromium and iron ppm levels are abnormal. Aluminum ppm levels are noted. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion.

CONTAMINATION

There is a moderate concentration of water present in the oil. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. High amount of ingressed dirt has caused abrasive wear to the component.

FLUID CONDITION

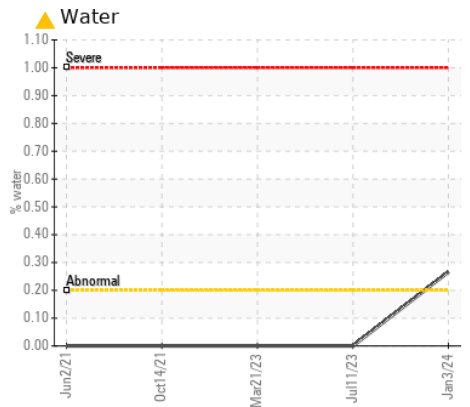
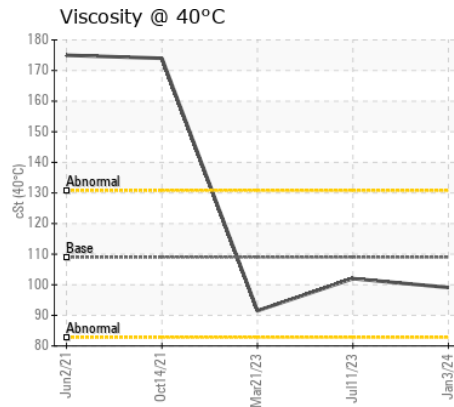
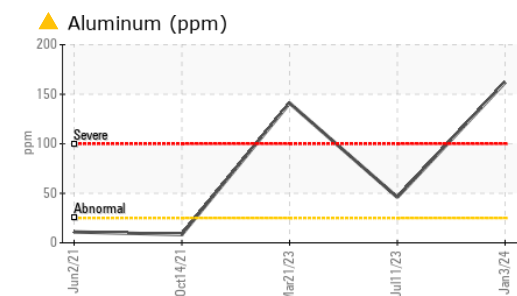
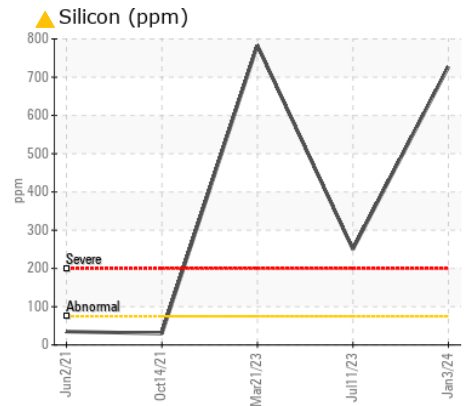
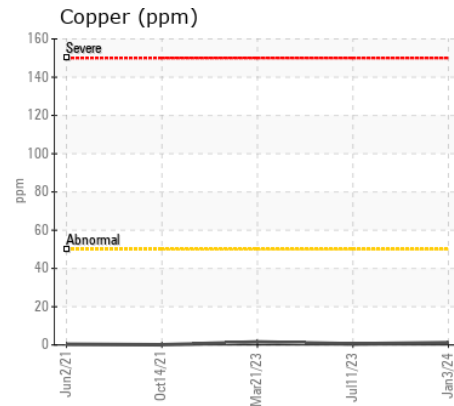
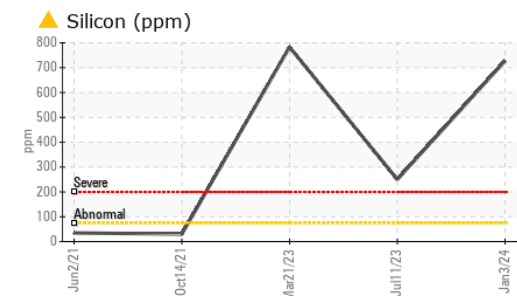
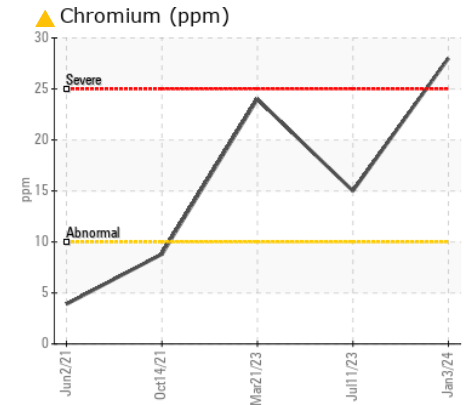
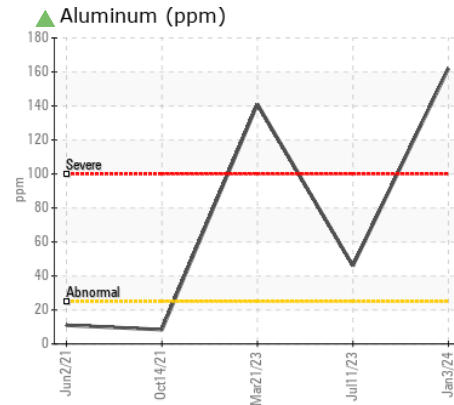
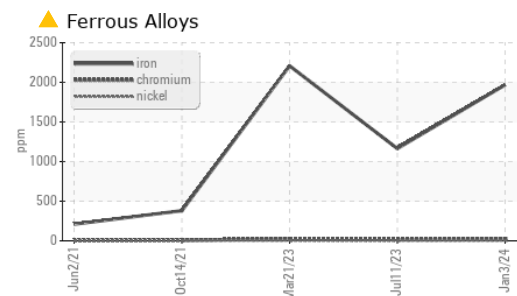
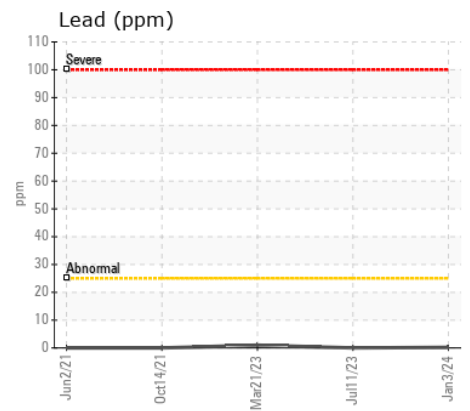
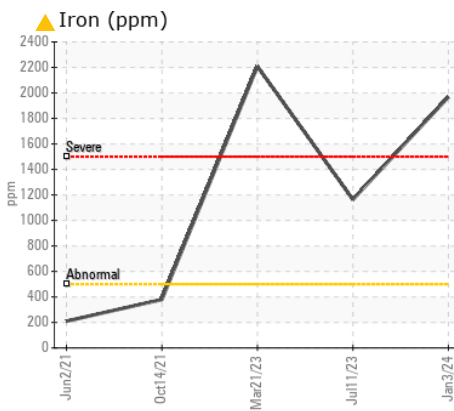
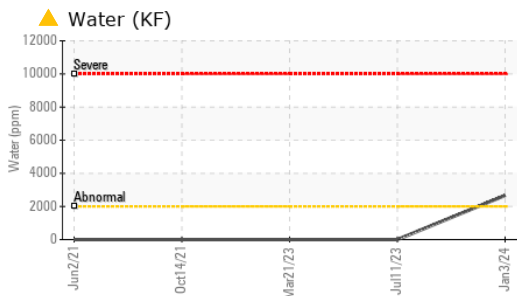
The oil is no longer serviceable as a result of the abnormal and/or severe wear.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | LH0172354 | LH0172345 | LH0257073 |
| Sample Date | | Client Info | | 03 Jan 2024 | 11 Jul 2023 | 21 Mar 2023 |
| Machine Age | hrs | Client Info | | 4951 | 4478 | 4098 |
| Oil Age | hrs | Client Info | | 0 | 0 | 0 |
| Filter Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | Changed | Not Changed | Changed |
| Filter Changed | | Client Info | | Not Changed | None | None |
| Sample Status | | | | ABNORMAL | ABNORMAL | SEVERE |

| | | | | | | |
|--------------|--------|---------------|------|---------------|--------|--------|
| PQ | | ASTM D8184* | | 189 | 18 | 160 |
| Iron | ppm | ASTM D5185(m) | >500 | ▲ 1968 | ▲ 1164 | ● 2208 |
| Chromium | ppm | ASTM D5185(m) | >10 | ▲ 28 | ▲ 15 | ▲ 24 |
| Nickel | ppm | ASTM D5185(m) | >10 | 2 | <1 | 2 |
| Titanium | ppm | ASTM D5185(m) | | 9 | 3 | 9 |
| Silver | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185(m) | >25 | ▲ 162 | 46 | ▲ 141 |
| Lead | ppm | ASTM D5185(m) | >25 | <1 | 0 | 1 |
| Copper | ppm | ASTM D5185(m) | >50 | 1 | <1 | 2 |
| Tin | ppm | ASTM D5185(m) | >10 | 0 | 0 | 0 |
| Vanadium | ppm | ASTM D5185(m) | | 0 | <1 | <1 |
| White Metal | scalar | Visual* | NONE | VLITE | NONE | NONE |
| Yellow Metal | scalar | Visual* | NONE | NONE | NONE | NONE |

| | | | | | | |
|------------------|--------|---------------|-------|----------------|-------|-------|
| Silicon | ppm | ASTM D5185(m) | >75 | ▲ 727 | 250 | ● 783 |
| Potassium | ppm | ASTM D5185(m) | >20 | 64 | 17 | 53 |
| Water | % | ASTM D6304* | >0.2 | ▲ 0.266 | --- | --- |
| ppm Water | ppm | ASTM D6304* | >2000 | ▲ 2667 | --- | --- |
| Silt | scalar | Visual* | NONE | NONE | VLITE | 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 | ▲ .2% | NEG | NEG |

| | | | | | | |
|-------------|-----|---------------|-------|--------------|-------|--------|
| Sodium | ppm | ASTM D5185(m) | | 30 | 11 | 37 |
| Boron | ppm | ASTM D5185(m) | 400 | 255 | 243 | 103 |
| Barium | ppm | ASTM D5185(m) | 200 | 0 | <1 | 0 |
| Molybdenum | ppm | ASTM D5185(m) | 12 | 2 | 1 | 2 |
| Manganese | ppm | ASTM D5185(m) | | 16 | 9 | 15 |
| Magnesium | ppm | ASTM D5185(m) | 12 | 223 | 88 | 211 |
| Calcium | ppm | ASTM D5185(m) | 150 | 632 | 221 | 574 |
| Phosphorus | ppm | ASTM D5185(m) | 1650 | 1200 | 1279 | 1236 |
| Zinc | ppm | ASTM D5185(m) | 125 | 15 | 10 | 23 |
| Sulfur | ppm | ASTM D5185(m) | 22500 | 21386 | 20760 | 25872 |
| Visc @ 40°C | cSt | ASTM D7279(m) | 109 | 99.1 | 102 | ▲ 91.5 |



ISO 17025:2017
Accredited
Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : LH0172354
Lab Number : 02608289
Unique Number : 5709375
Test Package : MOBCE (Additional Tests: KF, PQ, Visual)

MOOREFIELD EXCAVATING LTD.
 6297 WELLINGTON RD. 109S, RR #3
 HARRISTON, ON
 CA N0G 1Z0
 Contact: John Landman
 info@moorefieldex.ca
 T: (519)343-3571
 F: (519)510-3277

To discuss this sample report, contact Customer Service at 1-800-268-2131.
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
 Validity of results and interpretation are based on the sample and information as supplied.