LEAHY·WOLF
Lubricating specialists since 1946

# OIL ANALYSIS REPORT

| | |
|---|---|
| WEAR | ABNORMAL |
| CONTAMINANTS | NORMAL |
| OIL CONDITION | NORMAL |

Area
## K5 CONSTRUCTION CORPORATION - HODGKINS IL
Machine Id
## 1112
Component
## Hydraulic System
Fluid
## LEAHY WOLF LUBEMASTER HYDRAULIC OIL (43 GAL)

## RECOMMENDATION

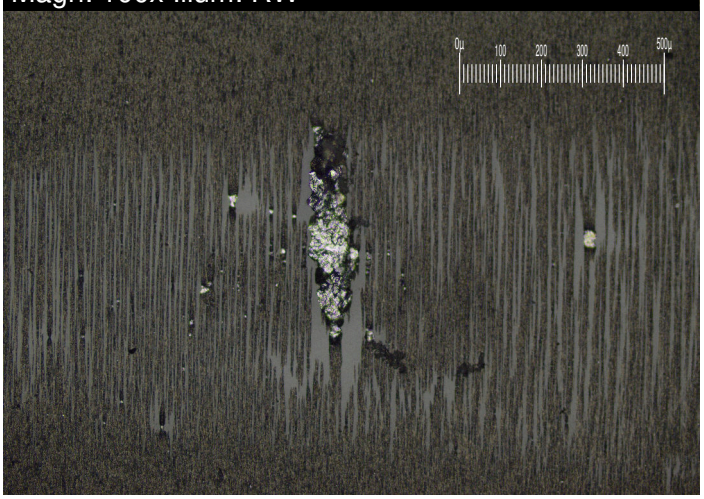
The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition. Analytical Ferrography: Industrial systems such as this tend to be robust and capable of taking significant wear before failure - while this system is not indicating it is in immediate danger of failure, it certainly is heading toward that without remediation of the issues showing here. Results indicate an abnormal amount of larger ferrous sliding wear particles, an abnormal amount of ferrous rubbing wear, and an abnormal amount of ferrous corrosive wear. Ferrous sliding wear may be a result of pump wear or possibly mechanical damage. Consider checking the pump for excessive wear or abnormal wear. Consider checking for mechanical damage on actuators - this is commonly found through reviewing seals for excessive leakage. Combined abnormal amounts of ferrous rubbing wear and ferrous corrosive wear without any external debris contamination are typically connected by a common issue. Excessive rubbing wear and corrosive wear can be caused by low anti-wear additives from improper lubricant use or top-off, high temperatures causing low operating viscosity and subsequent excessive metal-to-metal contact, or internal component misalignment within the system. Verify that the pump and components are seated properly and if the system is serviceable with alignment equipment, consider employing it. Verify that the system is operating at the correct temperature and that all lubricant coolers/heaters are functioning properly. Consider checking for possible lubrication issues and verify that the lubricant in use is the correct lubricant and that all top-ups have used the correct lubricant.

## WEAR

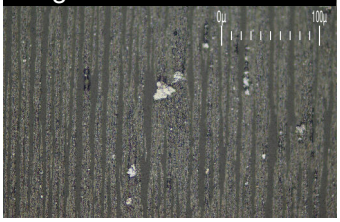
Wear particle analysis indicates that the ferrous sliding particles are abnormal. Iron ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing and ferrous corrosive particles are abnormal.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | LW0008356 | LW0005981 | LW0003335 |
| Sample Date | | Client Info | | 11 Dec 2023 | 25 Oct 2022 | 06 Oct 2021 |
| Machine Age | hrs | Client Info | | 136842 | 13362 | 13087 |
| Oil Age | hrs | Client Info | | 12517 | 1258 | 570 |
| Filter Age | hrs | Client Info | | 0 | 1258 | 570 |
| Oil Changed | | Client Info | | Changed | Not Changd | Not Changd |
| Filter Changed | | Client Info | | Changed | Changed | Not Changd |
| Sample Status | | | | ABNORMAL | NORMAL | ABNORMAL |
| Iron | ppm | ASTM D5185m | >20 | ▲ 59 | 11 | 10 |
| Chromium | ppm | ASTM D5185m | >10 | 0 | 0 | <1 |
| Nickel | ppm | ASTM D5185m | >10 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Silver | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >10 | <1 | 0 | 1 |
| Lead | ppm | ASTM D5185m | >10 | 0 | 0 | <1 |
| Copper | ppm | ASTM D5185m | >75 | 2 | 2 | 2 |
| Tin | ppm | ASTM D5185m | >10 | 0 | 0 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Ferrous Rubbing | Scale 0-10 | *ASTM D7684 | | ▲ 5 | | |
| Ferrous Sliding | Scale 0-10 | *ASTM D7684 | | ▲ 4 | | |
| Ferrous Cutting | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Rolling | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Break-in | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Spheres | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Black Oxides | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Red Oxides | Scale 0-10 | *ASTM D7684 | | | | |
| Ferrous Corrosive | Scale 0-10 | *ASTM D7684 | | ▲ 5 | | |
| Ferrous Other | Scale 0-10 | *ASTM D7684 | | | | |
| Nonferrous Rubbing | Scale 0-10 | *ASTM D7684 | | | | |
| Nonferrous Sliding | Scale 0-10 | *ASTM D7684 | | | | |
| Nonferrous Cutting | Scale 0-10 | *ASTM D7684 | | | | |
| Nonferrous Rolling | Scale 0-10 | *ASTM D7684 | | | | |
| Nonferrous Other | Scale 0-10 | *ASTM D7684 | | | | |

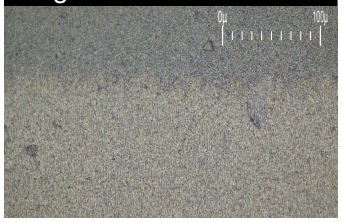
Magn: 100x Illum: RW



Magn: 500x Illum: RW



Magn: 500x Illum: RW



## CONTAMINANTS

There is no indication of any contamination in the oil.

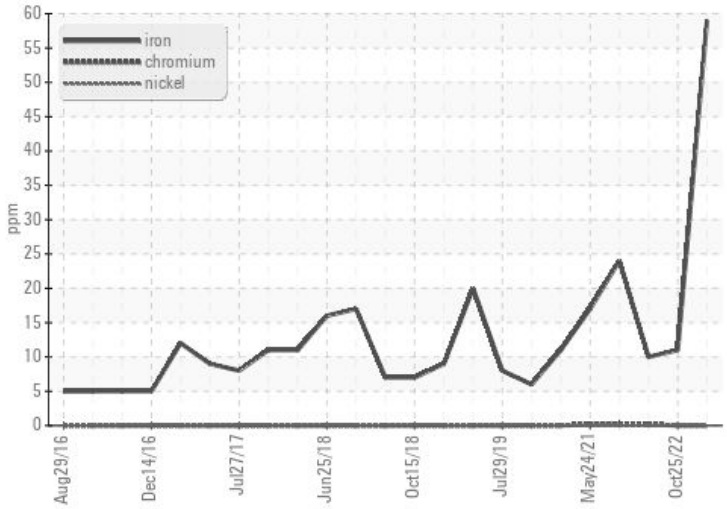
| | | | | | | |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | **7** | 8 | 6 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | 2 | 0 |
| Water | | WC Method | >0.1 | **NEG** | NEG | NEG |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Debris | scalar | *Visual | NONE | **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 |
| Carbonaceous Material | Scale 0-10 | *ASTM D7684 | | | | |
| Sand/Dirt | Scale 0-10 | ASTM D7684 | | | | |
| Fibres | Scale 0-10 | *ASTM D7684 | | | | |
| Spheres | Scale 0-10 | *ASTM D7684 | | | | |
| Other | Scale 0-10 | *ASTM D7684 | | | | |

## OIL CONDITION

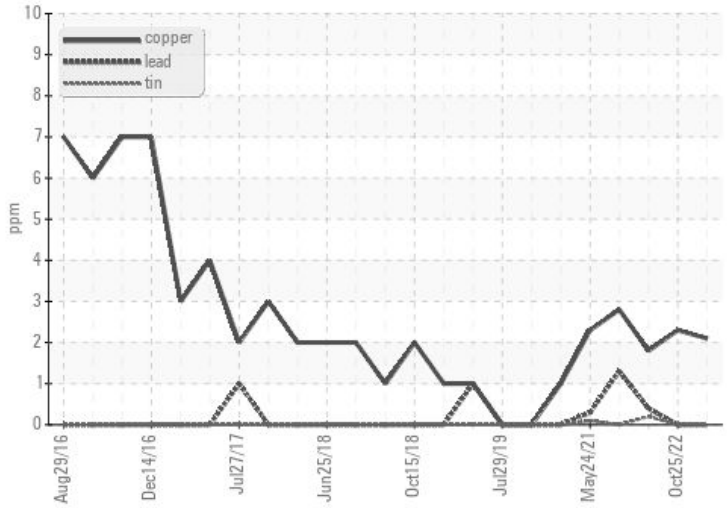
The oil is no longer serviceable as a result of the abnormal and/or severe wear.

| | | | | | | |
|---|---|---|---|---|---|---|
| Sodium | ppm | ASTM D5185m | | **4** | 3 | 7 |
| Boron | ppm | ASTM D5185m | | **63** | 80 | 98 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **4** | 6 | 7 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **77** | 96 | 117 |
| Calcium | ppm | ASTM D5185m | | **1905** | 2720 | 2954 |
| Phosphorus | ppm | ASTM D5185m | | **946** | 997 | 1026 |
| Zinc | ppm | ASTM D5185m | | **1108** | 1229 | 1331 |
| Sulfur | ppm | ASTM D5185m | | **2605** | 3212 | 2757 |
| Visc @ 40°C | cSt | ASTM D445 | | **46.3** | 49.1 | 50.3 |
| Lubricant Degradation | Scale 0-10 | *ASTM D7684 | | | | |

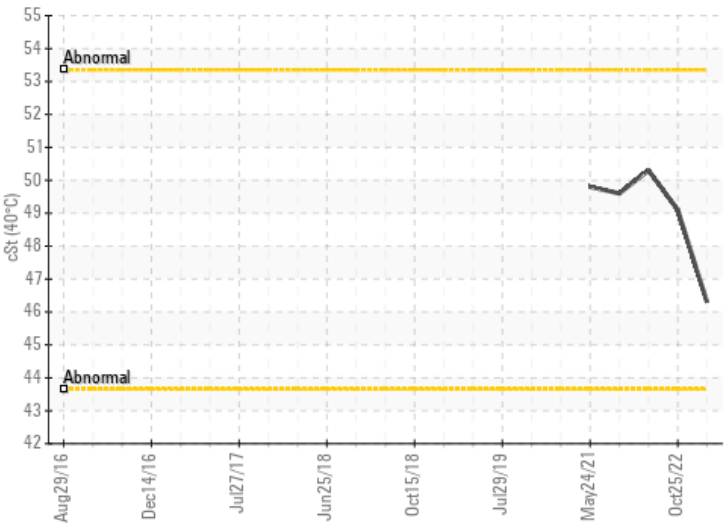
## Ferrous Alloys




## Non-ferrous Metals




## Viscosity @ 40°C




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : LW0008356 **Recieved** : 15 Dec 2023
**Lab Number** : 06036435 **Diagnosed** : 11 Jan 2024
**Unique Number** : 10791664 **Diagnostician** : Aaron Black
**Test Package** : FLEET ( Additional Tests: A-FERR )

*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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