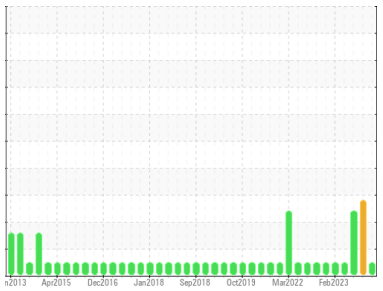
Hilcorp Alaska, LLC

# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Machine Id
## P-4005 Fire Water Pump
Component
**Tank Diesel Engine**
Fluid
**DIESEL ENGINE OIL SAE 15W40 (--- GAL)**

## DIAGNOSIS

**Recommendation**
Resample at the next service interval to monitor.

**Wear**
All component wear rates are normal.

**Contamination**
Fuel content negligible. 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 condition of the oil is suitable for further service.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **HLC0003122** | HLC0003110 | HLC0003125 |
| Sample Date | | Client Info | | **24 Feb 2024** | 11 Jan 2024 | 03 Jan 2024 |
| Machine Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **NORMAL** | SEVERE | SEVERE |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | **3** | 4 | 5 |
| Chromium | ppm | ASTM D5185m | >20 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | **<1** | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | **<1** | <1 | 1 |
| Silver | ppm | ASTM D5185m | >3 | **<1** | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | **2** | 3 | 2 |
| Lead | ppm | ASTM D5185m | >40 | **<1** | 1 | 2 |
| Copper | ppm | ASTM D5185m | >330 | **1** | <1 | 2 |
| Tin | ppm | ASTM D5185m | >15 | **<1** | 2 | 3 |
| Vanadium | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | <1 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 250 | **108** | 127 | 124 |
| Barium | ppm | ASTM D5185m | 10 | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 100 | **3** | 7 | 9 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 450 | **678** | 579 | 539 |
| Calcium | ppm | ASTM D5185m | 3000 | **1274** | 1165 | 1183 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **699** | 960 | 851 |
| Zinc | ppm | ASTM D5185m | 1350 | **799** | 1100 | 994 |
| Sulfur | ppm | ASTM D5185m | 4250 | **3006** | 3466 | 3080 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | **6** | 5 | 6 |
| Sodium | ppm | ASTM D5185m | >158 | **2** | 2 | 3 |
| Potassium | ppm | ASTM D5185m | >20 | **4** | 3 | 4 |
| Fuel | % | ASTM D3524 | >5 | **1.1** | ▲ 12.1 | ▲ 11.1 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0** | 0.1 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **6.2** | 6.2 | 6.2 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **17.6** | 17.9 | 17.5 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **12.1** | 11.7 | 11.5 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 8.5 | **10.61** | 9.29 | 8.95 |

# OIL ANALYSIS REPORT

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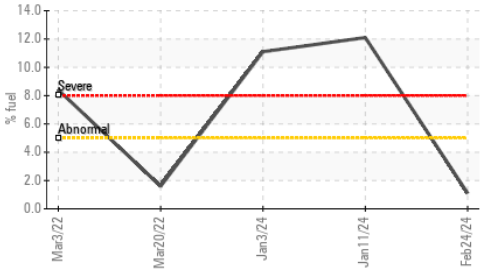
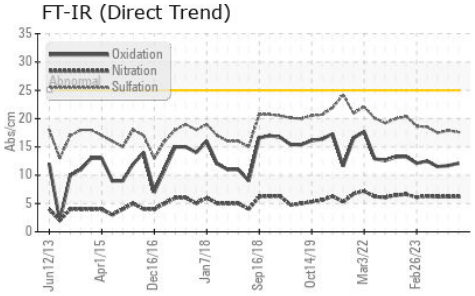
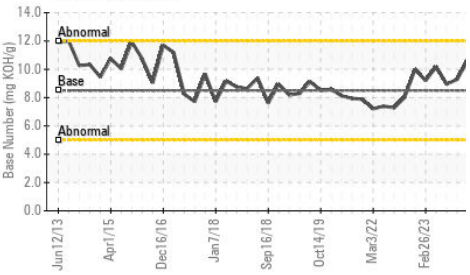
Fuel Dilution



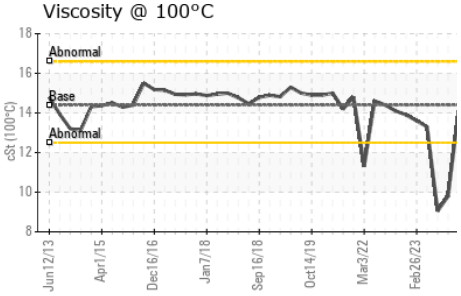

FT-IR (Direct Trend)




Base Number




Viscosity @ 100°C

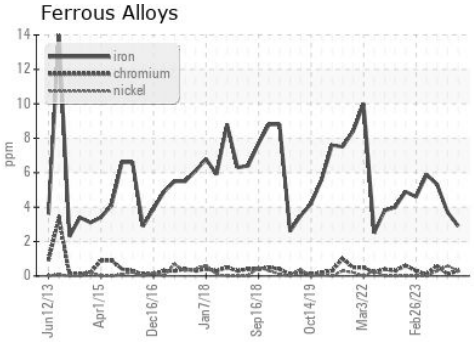



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **LIGHT** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 | >0.2 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

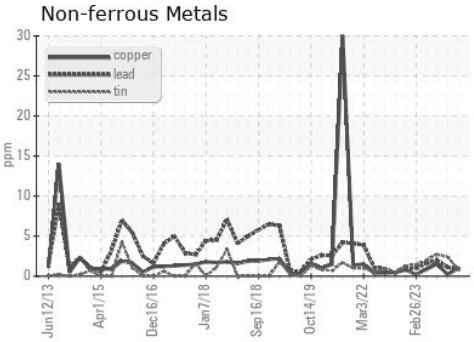
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | **14.1** | ▲ 9.8 | ▲ 9.05 |

GRAPHS

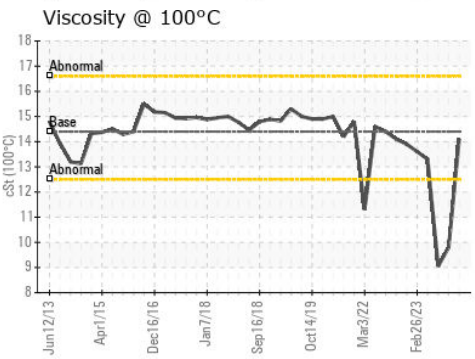
Ferrous Alloys



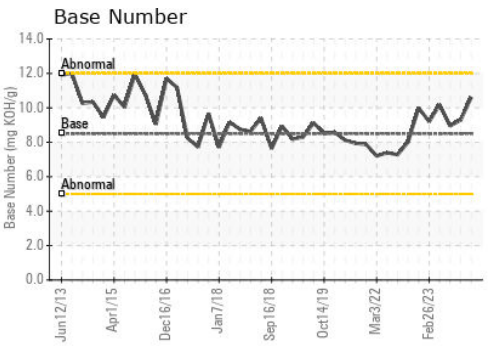

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : HLC0003122
**Lab Number** : 06131501
**Unique Number** : 10950966
**Test Package** : IND 2 ( Additional Tests: PercentFuel )

**Received** : 27 Mar 2024
**Tested** : 11 Apr 2024
**Diagnosed** : 11 Apr 2024 - Jonathan Hester

*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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