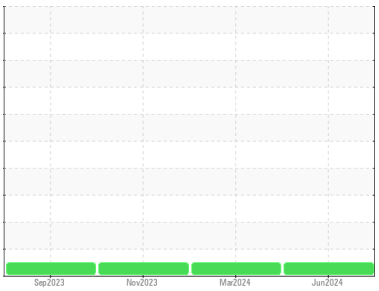
HUTCHENS RENTZ-EDEN

# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Machine Id
## CATERPILLAR RH BEYMER
Component
**Starboard Main Engine**
Fluid
**KENDALL SUPER-D XA 15W40 (--- GAL)**

## DIAGNOSIS

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

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

**Contamination**
Elevated aluminum (Al) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. 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 | | **HRE0000251** | WC0843957 | WC0843977 |
| Sample Date | | Client Info | | **07 Jun 2024** | 07 Mar 2024 | 15 Nov 2023 |
| Machine Age | hrs | Client Info | | **38018** | 35852 | 33233 |
| Oil Age | hrs | Client Info | | **500** | 500 | 500 |
| Oil Changed | | Client Info | | **Changed** | Changed | Changed |
| Sample Status | | | | **NORMAL** | NORMAL | NORMAL |

| 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 | >75 | **27** | 25 | 11 |
| Chromium | ppm | ASTM D5185m | >8 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | **0** | 0 | <1 |
| Titanium | ppm | ASTM D5185m | >3 | **71** | 49 | 55 |
| Silver | ppm | ASTM D5185m | >2 | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | **2** | 2 | 2 |
| Lead | ppm | ASTM D5185m | >18 | **1** | 5 | <1 |
| Copper | ppm | ASTM D5185m | >80 | **6** | 7 | 3 |
| Tin | ppm | ASTM D5185m | >14 | **0** | 1 | 0 |
| Vanadium | ppm | ASTM D5185m | | **<1** | 1 | <1 |
| Cadmium | ppm | ASTM D5185m | | **0** | <1 | <1 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 50 | **40** | 49 | 102 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 9 |
| Molybdenum | ppm | ASTM D5185m | | **13** | 28 | 36 |
| Manganese | ppm | ASTM D5185m | | **0** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 270 | **357** | 305 | 285 |
| Calcium | ppm | ASTM D5185m | 1900 | **1968** | 2130 | 1930 |
| Phosphorus | ppm | ASTM D5185m | 1000 | **990** | 1003 | 1019 |
| Zinc | ppm | ASTM D5185m | 1260 | **1267** | 1290 | 1171 |
| Sulfur | ppm | ASTM D5185m | 3400 | **3608** | 4452 | 4011 |

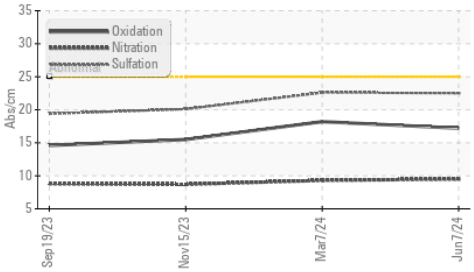
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | **4** | 3 | 4 |
| Sodium | ppm | ASTM D5185m | >75 | **6** | 3 | <1 |
| Potassium | ppm | ASTM D5185m | >20 | **6** | 3 | 4 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | | **0.4** | 0.4 | 0.2 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **9.5** | 9.3 | 8.7 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **22.5** | 22.6 | 20.1 |

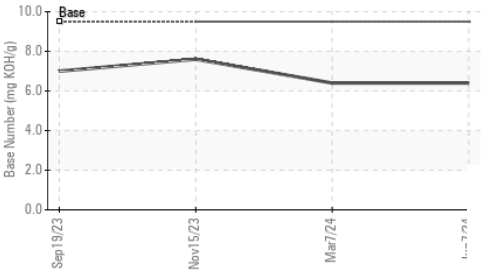
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **17.2** | 18.2 | 15.5 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 9.5 | **6.4** | 6.4 | 7.6 |

# OIL ANALYSIS REPORT

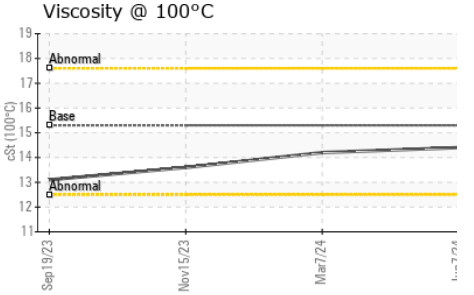
FT-IR (Direct Trend)




Base Number




Viscosity @ 100°C

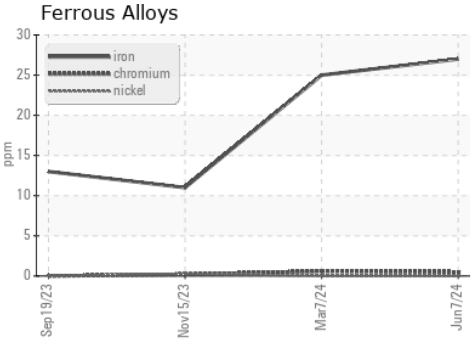



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 |

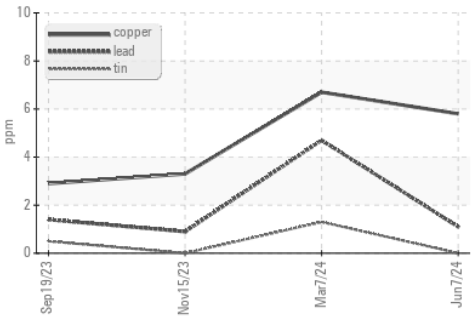
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 15.3 | **14.4** | 14.2 | 13.6 |

## GRAPHS

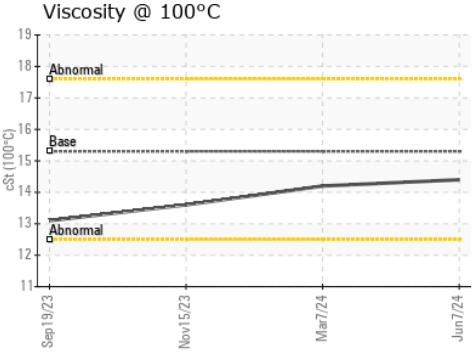
Ferrous Alloys



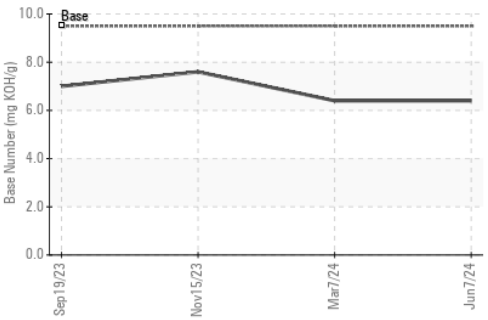

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : HRE0000251
**Lab Number** : 06216471
**Unique Number** : 11089335
**Test Package** : FLEET

**Received** : 20 Jun 2024
**Tested** : 22 Jun 2024
**Diagnosed** : 22 Jun 2024 - Wes Davis

*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)*

**SUPERIOR MARINE**
201 KELLY LANE
CHESAPEAKE, OH
US 45619
Contact: DARRELL KEARNS
darrellkearns@superiormarineinc.com
T:
F: