MAR II

WEAR CHECK Inland Marine Oil Analysis Program

# OIL ANALYSIS REPORT

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

Area
**WILLARD HAMMOND**
Machine Id
**[WILLARD HAMMOND] 001 587215-1**
Component
**Port Main Engine**
Fluid
**CHEVRON DELO 400 MULTIGRADE 15W40 (36 GAL)**

## RECOMMENDATION

No corrective action is recommended at this time. Resample at the next service interval to monitor.

## WEAR

Bearing and/or bushing wear is indicated.

## CONTAMINATION

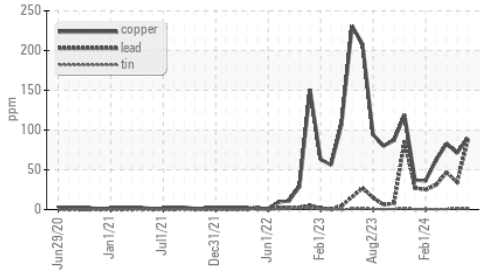
There is no indication of any contamination in the oil.

## FLUID CONDITION

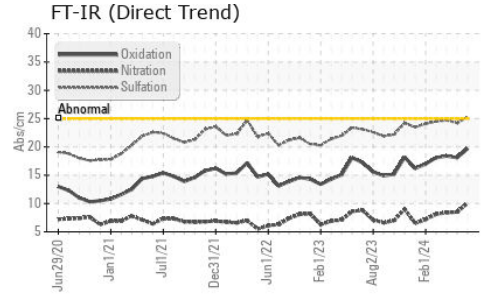
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | MW0072274 | MW0070926 | MW0051350 |
| Sample Date | | Client Info | | 01 Jun 2024 | 01 May 2024 | 31 Mar 2024 |
| Machine Age | hrs | Client Info | | 14407 | 13681 | 12794 |
| Oil Age | hrs | Client Info | | 4763 | 4043 | 3180 |
| Filter Age | hrs | Client Info | | 816 | 96 | 708 |
| Oil Changed | | Client Info | | Not Changd | Not Changd | Not Changd |
| Filter Changed | | Client Info | | Not Changd | Not Changd | Not Changd |
| Sample Status | | | | ABNORMAL | ABNORMAL | ABNORMAL |
| Iron | ppm | ASTM D5185m | >75 | 24 | 15 | 16 |
| Chromium | ppm | ASTM D5185m | >8 | 0 | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | 0 | <1 | <1 |
| Titanium | ppm | ASTM D5185m | >3 | 0 | <1 | 0 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 1 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | 4 | 4 | 3 |
| Lead | ppm | ASTM D5185m | >18 | ▲ 86 | ▲ 34 | ▲ 47 |
| Copper | ppm | ASTM D5185m | >80 | ▲ 90 | ▲ 71 | ▲ 83 |
| Tin | ppm | ASTM D5185m | >14 | 1 | 1 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Silicon | ppm | ASTM D5185m | >20 | 8 | 8 | 7 |
| Potassium | ppm | ASTM D5185m | >20 | 3 | 2 | 0 |
| 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 |
| Soot % | % | *ASTM D7844 | | 0.6 | 0.4 | 0.4 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 10.1 | 8.5 | 8.4 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 25.3 | 24.2 | 24.7 |
| 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 |
| Sodium | ppm | ASTM D5185m | >75 | <1 | 2 | <1 |
| Boron | ppm | ASTM D5185m | 151 | 206 | 252 | 282 |
| Barium | ppm | ASTM D5185m | 0.4 | 0 | <1 | <1 |
| Molybdenum | ppm | ASTM D5185m | 250 | 126 | 113 | 135 |
| Manganese | ppm | ASTM D5185m | | 4 | 2 | 2 |
| Magnesium | ppm | ASTM D5185m | 0 | 723 | 556 | 752 |
| Calcium | ppm | ASTM D5185m | 2046 | 1745 | 1422 | 1949 |
| Phosphorus | ppm | ASTM D5185m | 1043 | 754 | 571 | 832 |
| Zinc | ppm | ASTM D5185m | 943 | 962 | 717 | 1048 |
| Sulfur | ppm | ASTM D5185m | 5012 | 3146 | 2282 | 3561 |
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 19.7 | 18.1 | 18.4 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 12.5 | 5.92 | 8.92 | 7.44 |
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 13.2 | 13.3 | 13.2 |

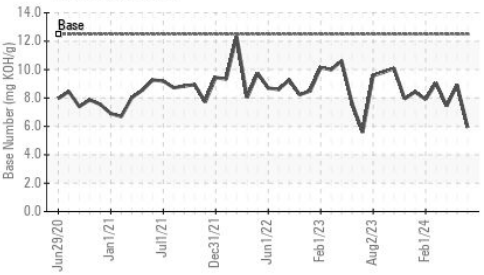
Non-ferrous Metals



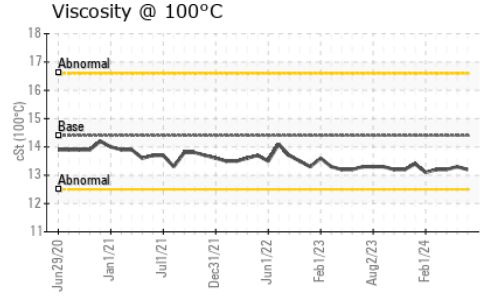

FT-IR (Direct Trend)



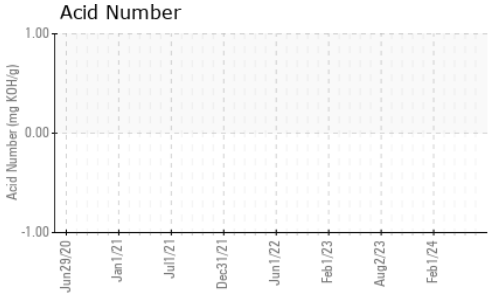

Base Number



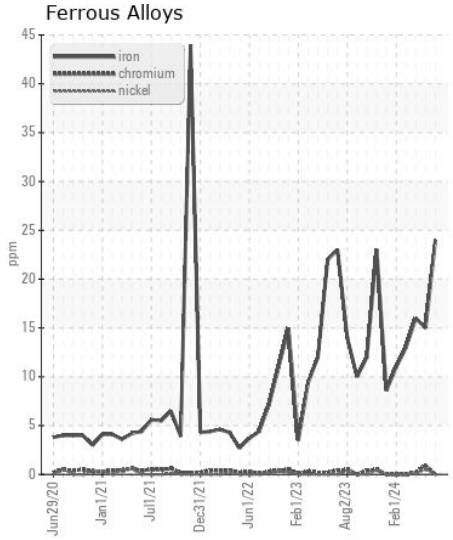

Viscosity @ 100°C



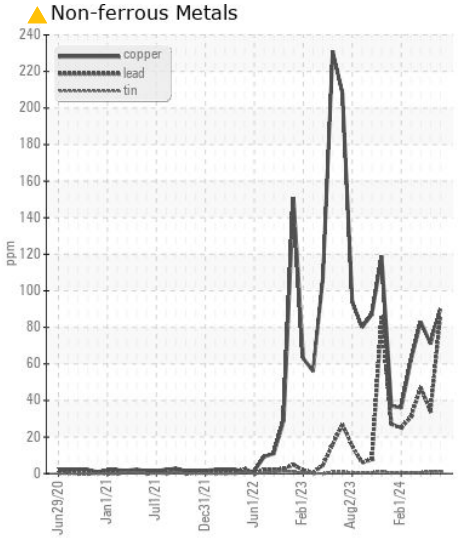

Acid Number



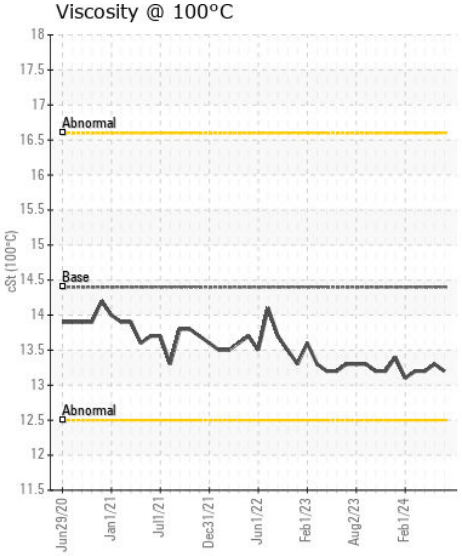

Ferrous Alloys



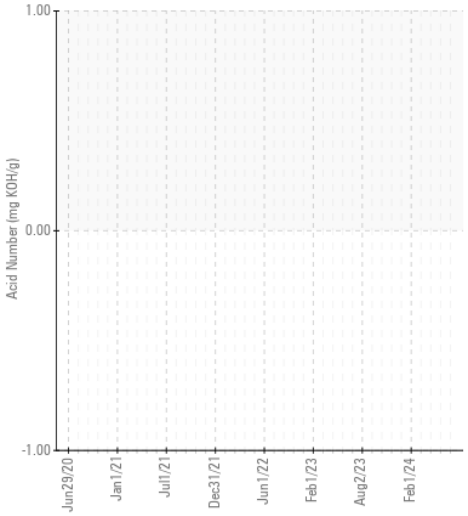

Non-ferrous Metals




Viscosity @ 100°C




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : MW0072274
**Lab Number** : 06224107
**Unique Number** : 11102304
**Test Package** : MAR 2 ( Additional Tests: KV40, TAN Man )
**Received** : 28 Jun 2024
**Tested** : 02 Jul 2024
**Diagnosed** : 02 Jul 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)*

**INGRAM BARGE**
900 S 3RD ST
PADUCAH, KY
US 42003
Contact: CHARLES COPELAND
charles.copeland@ingrambarge.com
T: (270)415-4467
F: (615)695-3697