MAR II

WEAR CHECK Inland Marine Oil Analysis Program

# OIL ANALYSIS REPORT

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

Area
**WILLARD HAMMOND**
Machine Id
**[WILLARD HAMMOND] 003 587215-3**
Component
**Starboard Main Engine**
Fluid
**CHEVRON DELO 400 MULTIGRADE 15W40 (36 GAL)**

## RECOMMENDATION

Resample at the next service interval to monitor.

## WEAR

All component wear rates are normal.

## CONTAMINATION

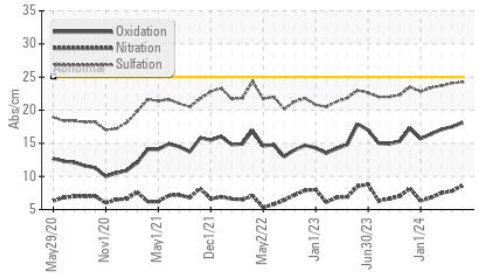
There is no indication of any contamination in the oil.

## FLUID CONDITION

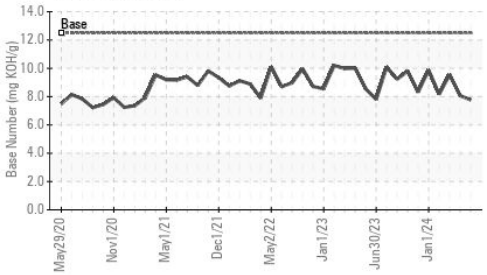
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | MW0070927 | MW0064393 | MW0068068 |
| Sample Date | | Client Info | | 01 May 2024 | 31 Mar 2024 | 14 Mar 2024 |
| Machine Age | hrs | Client Info | | 13681 | 12794 | 12386 |
| Oil Age | hrs | Client Info | | 4043 | 3180 | 0 |
| Filter Age | hrs | Client Info | | 96 | 708 | 0 |
| Oil Changed | | Client Info | | Not Changd | Not Changd | N/A |
| Filter Changed | | Client Info | | Not Changd | Not Changd | N/A |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |
| Iron | ppm | ASTM D5185m | >120 | 15 | 12 | 10 |
| Chromium | ppm | ASTM D5185m | >10 | <1 | <1 | 0 |
| Nickel | ppm | ASTM D5185m | >5 | <1 | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| Silver | ppm | ASTM D5185m | >5 | 1 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 4 | 3 | 3 |
| Lead | ppm | ASTM D5185m | >40 | 34 | 23 | 12 |
| Copper | ppm | ASTM D5185m | >300 | 72 | 58 | 43 |
| Tin | ppm | ASTM D5185m | >10 | 1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | <1 | <1 | 0 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Silicon | ppm | ASTM D5185m | >25 | 8 | 6 | 6 |
| Potassium | ppm | ASTM D5185m | >20 | 2 | 0 | <1 |
| 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 | | 0.4 | 0.3 | 0.3 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 8.6 | 7.8 | 7.5 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 24.2 | 24.1 | 23.7 |
| 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 | | 2 | 0 | 3 |
| Boron | ppm | ASTM D5185m | 151 | 258 | 293 | 282 |
| Barium | ppm | ASTM D5185m | 0.4 | <1 | <1 | 0 |
| Molybdenum | ppm | ASTM D5185m | 250 | 113 | 132 | 113 |
| Manganese | ppm | ASTM D5185m | | 2 | 2 | 1 |
| Magnesium | ppm | ASTM D5185m | 0 | 566 | 730 | 629 |
| Calcium | ppm | ASTM D5185m | 2046 | 1438 | 1977 | 1530 |
| Phosphorus | ppm | ASTM D5185m | 1043 | 592 | 804 | 668 |
| Zinc | ppm | ASTM D5185m | 943 | 739 | 1011 | 787 |
| Sulfur | ppm | ASTM D5185m | 5012 | 2393 | 3486 | 2801 |
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 18.1 | 17.5 | 17.1 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 12.5 | 7.77 | 8.07 | 9.55 |
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 13.19 | 13.1 | 13.2 |

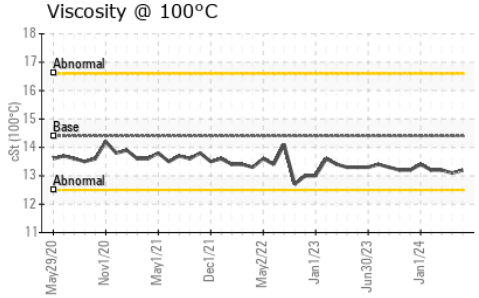
FT-IR (Direct Trend)



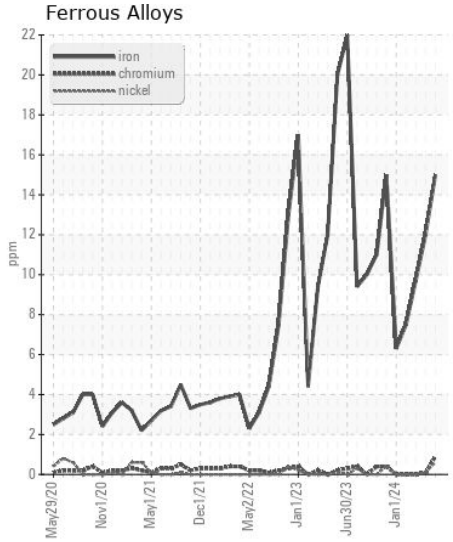

Base Number



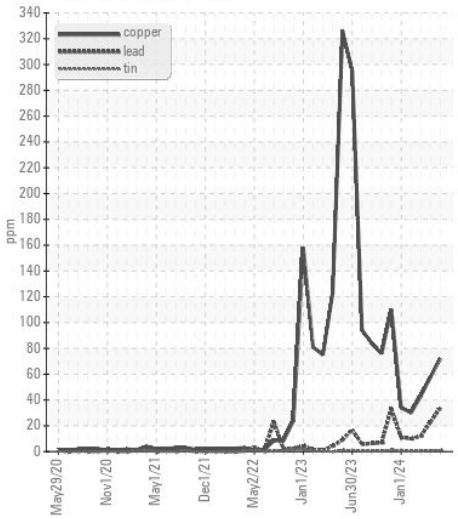

Viscosity @ 100°C



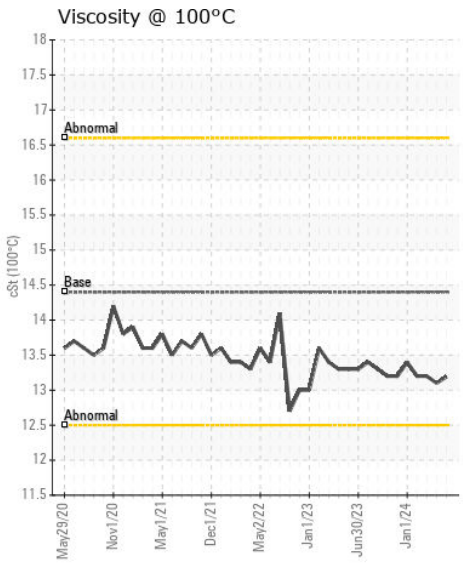

Ferrous Alloys



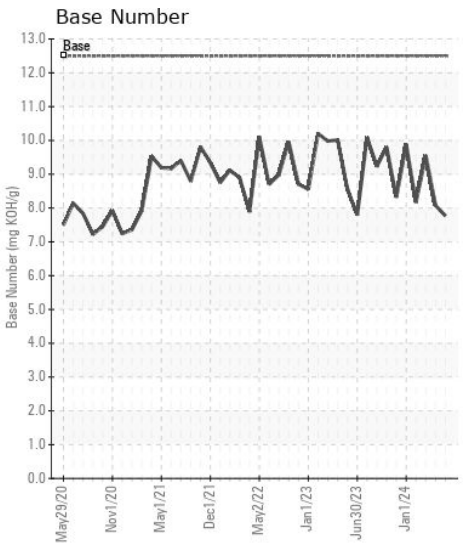

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : MW0070927
**Lab Number** : 06193052
**Unique Number** : 11049804
**Test Package** : MAR 2

**Received** : 28 May 2024
**Tested** : 31 May 2024
**Diagnosed** : 31 May 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)*

**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