



Machine Id
MWL
Component
Starboard Main Engine
Fluid
CHEVRON DELO 400 XLE 15W40 (39 GAL)

RECOMMENDATION

We advise that you check the fuel injection system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | MW05904211 | MW05843075 | MW05823800 |
| Sample Date | | Client Info | | 20 Jul 2023 | 09 May 2023 | 18 Apr 2023 |
| Machine Age | hrs | Client Info | | 36707 | 35532 | 33955 |
| Oil Age | hrs | Client Info | | 975 | 832 | 866 |
| Filter Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | N/A | N/A | N/A |
| Filter Changed | | Client Info | | N/A | N/A | N/A |
| Sample Status | | | | SEVERE | SEVERE | SEVERE |

WEAR

The lead level is abnormal. All other component wear rates are normal.

| | | | | | | |
|--------------|--------|-------------|------|--------------|------|------|
| Iron | ppm | ASTM D5185m | >75 | 24 | 10 | 15 |
| Chromium | ppm | ASTM D5185m | >8 | 2 | <1 | 1 |
| Nickel | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | >3 | <1 | 2 | 0 |
| Silver | ppm | ASTM D5185m | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | 2 | 2 | 0 |
| Lead | ppm | ASTM D5185m | >18 | ▲ 52 | <1 | 10 |
| Copper | ppm | ASTM D5185m | >80 | 1 | <1 | <1 |
| Tin | ppm | ASTM D5185m | >14 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |

CONTAMINATION

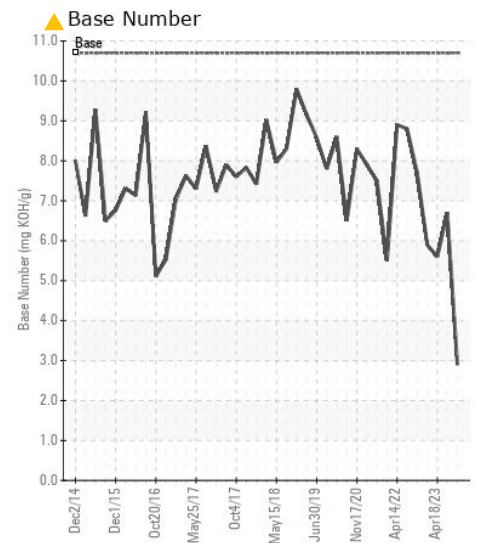
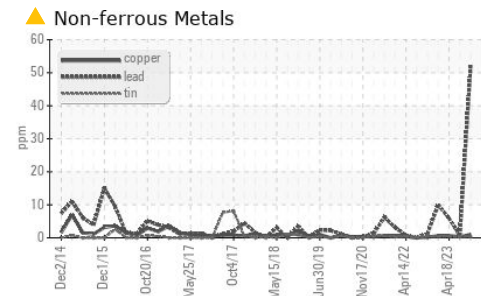
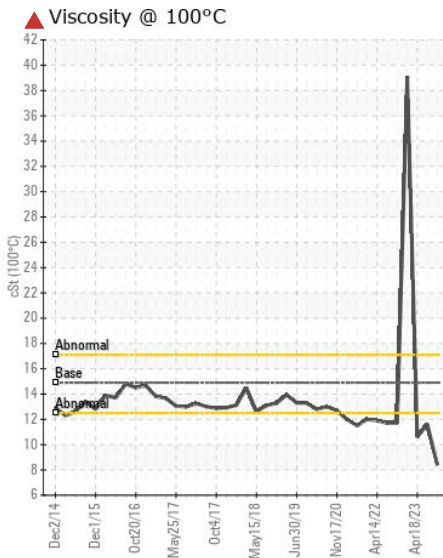
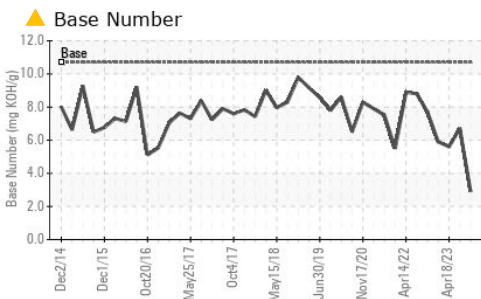
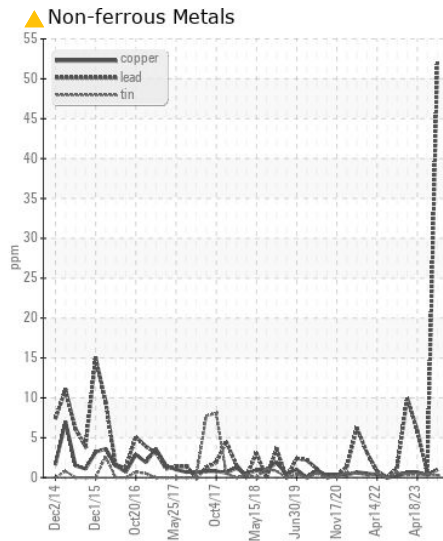
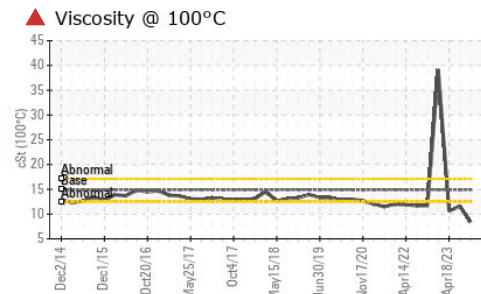
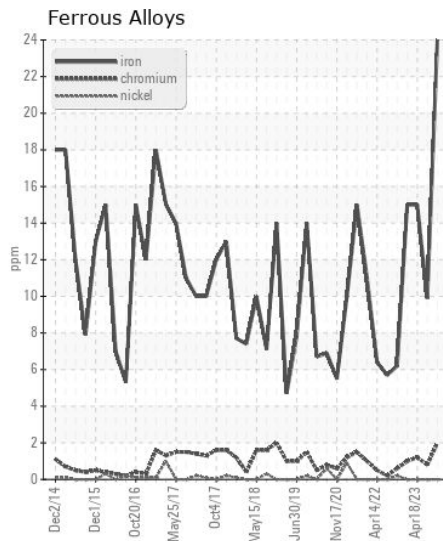
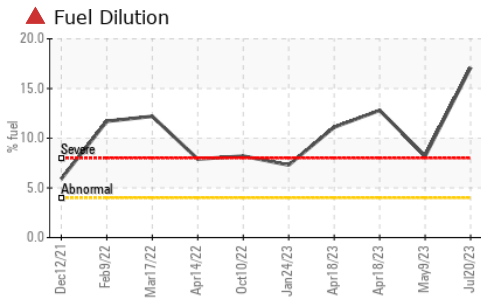
Tests confirm the presence of fuel in the oil.

| | | | | | | |
|------------------|----------|-------------|-------|---------------|--------------|---------------|
| Silicon | ppm | ASTM D5185m | >20 | 4 | 4 | 5 |
| Potassium | ppm | ASTM D5185m | >20 | 0 | 2 | 2 |
| Fuel | % | ASTM D3524 | >4.0 | ▲ 17.1 | ▲ 8.2 | ▲ 12.8 |
| Water | | WC Method | >0.1 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| Soot % | % | *ASTM D7844 | | 2.7 | 1.9 | 2.2 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 10.0 | 7.8 | 8.4 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 29.3 | 25.9 | 27.5 |
| 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 |

FLUID CONDITION

The oil viscosity is lower than normal. The BN level is low. The oil is no longer serviceable due to the presence of contaminants.

| | | | | | | |
|------------------|----------|-------------|------|--------------|---------------|---------------|
| Sodium | ppm | ASTM D5185m | >75 | 3 | 2 | 2 |
| Boron | ppm | ASTM D5185m | | 62 | 209 | 267 |
| Barium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | 25 | 77 | 92 |
| Manganese | ppm | ASTM D5185m | | <1 | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | 183 | 501 | 447 |
| Calcium | ppm | ASTM D5185m | | 1782 | 1254 | 1244 |
| Phosphorus | ppm | ASTM D5185m | 760 | 694 | 694 | 718 |
| Zinc | ppm | ASTM D5185m | 830 | 834 | 844 | 874 |
| Sulfur | ppm | ASTM D5185m | 2770 | 3292 | 2704 | 2388 |
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 27.4 | 20.4 | 23.2 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 10.7 | ▲ 2.9 | 6.7 | 5.6 |
| Visc @ 100°C | cSt | ASTM D445 | 14.9 | ▲ 8.4 | ▲ 11.6 | ▲ 10.6 |



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MW05904211 **Received** : 21 Jul 2023
Lab Number : 05904211 **Tested** : 24 Jul 2023
Unique Number : 10565567 **Diagnosed** : 24 Jul 2023 - Angela Borella
Test Package : MAR 2 (Additional Tests: PercentFuel)

ILLINOIS MARINE TOWING
 PO BOX 391
 LEMONT, IL
 US 60439
 Contact: RHETT DANIEL
 rdaniel@imtowing.com
 T: (630)280-4926
 F: (630)739-2041

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)