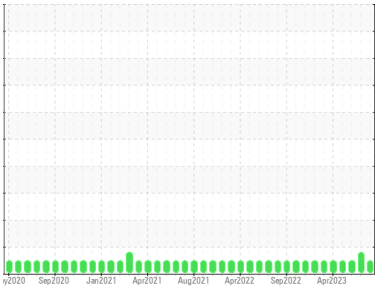
# OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Area
**Marathon**
Machine Id
## [Marathon] Oil - Port Main Engine
Component
**Port Main Engine**
Fluid
**DIESEL ENGINE OIL SAE 15W40 (150 GAL)**

## DIAGNOSIS

**Recommendation**
Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

**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.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0769283** | WC0769295 | WC0769288 |
| Sample Date | | Client Info | | **25 Sep 2023** | 27 Aug 2023 | 27 Jun 2023 |
| Machine Age | hrs | Client Info | | **3367** | 2688 | 1822 |
| Oil Age | hrs | Client Info | | **3367** | 734 | 1822 |
| Oil Changed | | Client Info | | **N/A** | Filtered | Filtered |
| Sample Status | | | | **NORMAL** | ABNORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >4.0 | **<1.0** | <1.0 | <1.0 |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >75 | **10** | 9 | 6 |
| Chromium | ppm | ASTM D5185m | >8 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | **0** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | >3 | **<1** | 2 | <1 |
| Silver | ppm | ASTM D5185m | >2 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >15 | **1** | 2 | <1 |
| Lead | ppm | ASTM D5185m | >18 | **2** | 2 | 0 |
| Copper | ppm | ASTM D5185m | >80 | **6** | ▲ 190 | 4 |
| Tin | ppm | ASTM D5185m | >14 | **1** | 2 | <1 |
| Vanadium | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | <1 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | 250 | **117** | 133 | 144 |
| Barium | ppm | ASTM D5185m | 10 | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 100 | **69** | 64 | 50 |
| Manganese | ppm | ASTM D5185m | | **<1** | 1 | <1 |
| Magnesium | ppm | ASTM D5185m | 450 | **681** | 766 | 633 |
| Calcium | ppm | ASTM D5185m | 3000 | **1687** | 2078 | 1754 |
| Phosphorus | ppm | ASTM D5185m | 1150 | **865** | 928 | 902 |
| Zinc | ppm | ASTM D5185m | 1350 | **1146** | 1222 | 1134 |
| Sulfur | ppm | ASTM D5185m | 4250 | **2905** | 3744 | 3516 |

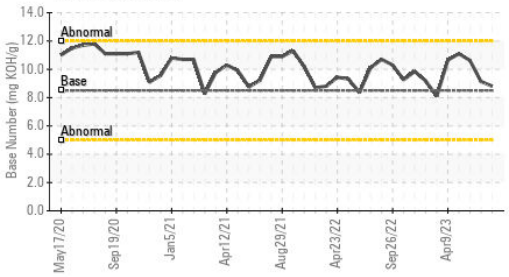
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | **3** | 4 | 2 |
| Sodium | ppm | ASTM D5185m | >158 | **2** | 4 | 3 |
| Potassium | ppm | ASTM D5185m | >20 | **3** | 3 | 3 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | | **0.2** | 0.2 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **9.3** | 9.3 | 8.6 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **22.4** | 22.9 | 22.1 |

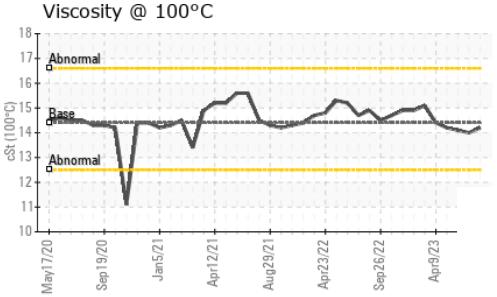
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **19.1** | 19.6 | 17.7 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 8.5 | **8.81** | 9.14 | 10.62 |

# OIL ANALYSIS REPORT

Base Number




Viscosity @ 100°C

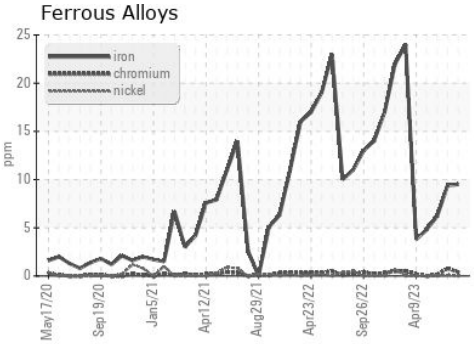



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
|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

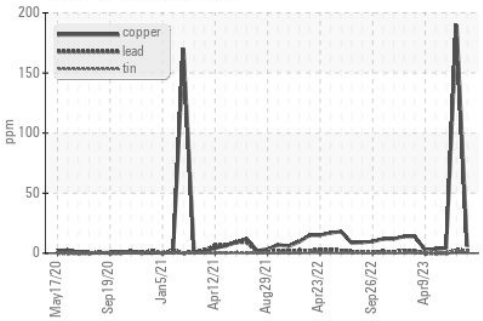
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | **14.2** | 14.0 | 14.1 |

## GRAPHS

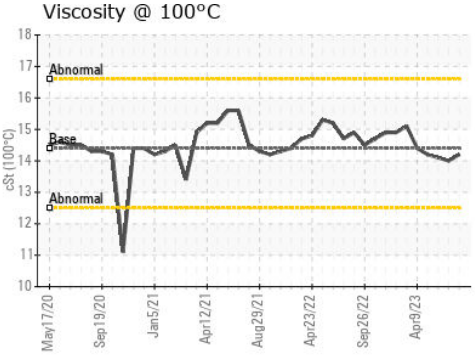
Ferrous Alloys



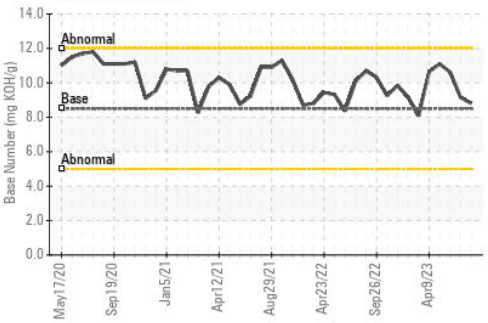

Non-ferrous Metals




Viscosity @ 100°C




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0769283
**Lab Number** : 05967932
**Unique Number** : 10674483
**Test Package** : IND 2

**Received** : 03 Oct 2023
**Diagnosed** : 04 Oct 2023
**Diagnostician** : 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)*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