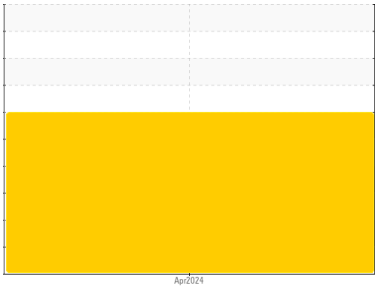
# PROBLEM SUMMARY

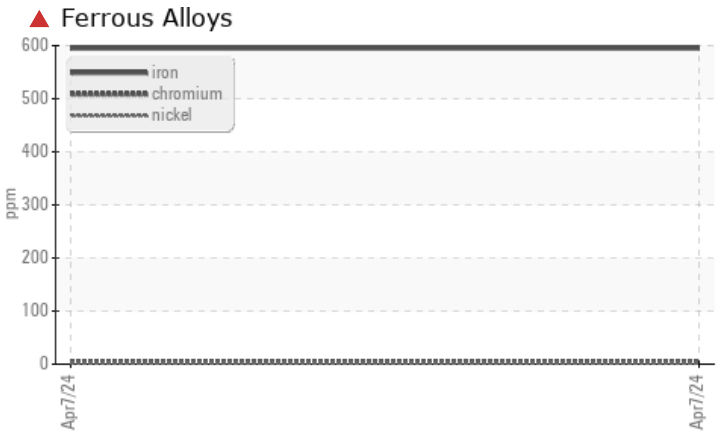
Sample Rating Trend

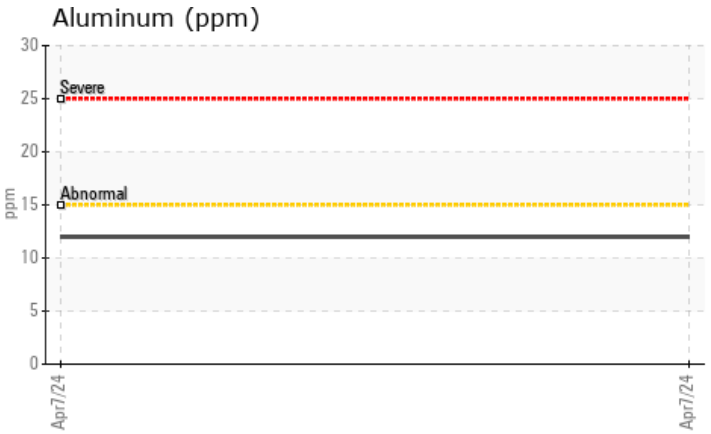



WEAR

Machine Id
## LMA104502 (S/N CDRM5006G990)
Component
**Starboard Main Engine**
Fluid
**{not provided} (--- LTR)**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

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. Please specify the brand, type, and viscosity of the oil on your next sample.

## PROBLEMATIC TEST RESULTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample Status | | | | **SEVERE** | --- | --- |
| Iron | ppm | ASTM D5185(m) | >75 | ▲ **595** | --- | --- |


**Customer Id:** MAR4MIN
**Sample No.:** PP
**Lab Number:** 02646082
**Test Package:** MAR 1

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
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Kevin.Marson@wearcheck.com

*To change component or sample information:*
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gloria.gonzalez@wearcheck.com

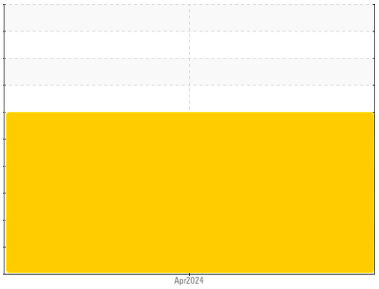
## RECOMMENDED ACTIONS

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Change Fluid | --- | --- | ? | We recommend that you drain the oil from the component if this has not already been done. |
| Resample | --- | --- | ? | We recommend an early resample to monitor this condition. |
| Information Required | --- | --- | ? | Please specify the brand, type, and viscosity of the oil on your next sample. |

## HISTORICAL DIAGNOSIS

# OIL ANALYSIS REPORT

Sample Rating Trend




WEAR

Machine Id
## LMA104502 (S/N CDRM5006G990)
Component
**Starboard Main Engine**
Fluid
**{not provided} (--- LTR)**

## DIAGNOSIS

**▲ Recommendation**
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. Please specify the brand, type, and viscosity of the oil on your next sample.

**▲ Wear**
Iron ppm levels are severe. Cylinder, crank, or cam shaft wear is indicated. Light concentration of visible metal present. Component wear metal level(s) high for break in.

**Contamination**
There is no indication of any contamination in the oil.

**Fluid Condition**
The oil is no longer serviceable as a result of the abnormal and/or severe wear.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **PP** | --- | --- |
| Sample Date | | Client Info | | **07 Apr 2024** | --- | --- |
| Machine Age | hrs | Client Info | | **1099** | --- | --- |
| Oil Age | hrs | Client Info | | **0** | --- | --- |
| Oil Changed | | Client Info | | **N/A** | --- | --- |
| Sample Status | | | | **SEVERE** | --- | --- |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >4.0 | **<1.0** | --- | --- |
| Water | | WC Method | >0.1 | **NEG** | --- | --- |
| Glycol | | WC Method | | **NEG** | --- | --- |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184* | | **32** | --- | --- |
| Iron | ppm | ASTM D5185(m) | >75 | ▲ **595** | --- | --- |
| Chromium | ppm | ASTM D5185(m) | >8 | **3** | --- | --- |
| Nickel | ppm | ASTM D5185(m) | >2 | **2** | --- | --- |
| Titanium | ppm | ASTM D5185(m) | >3 | **<1** | --- | --- |
| Silver | ppm | ASTM D5185(m) | >2 | **0** | --- | --- |
| Aluminum | ppm | ASTM D5185(m) | >15 | **12** | --- | --- |
| Lead | ppm | ASTM D5185(m) | >18 | **15** | --- | --- |
| Copper | ppm | ASTM D5185(m) | >80 | **25** | --- | --- |
| Tin | ppm | ASTM D5185(m) | >14 | **10** | --- | --- |
| Antimony | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Vanadium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Beryllium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Cadmium | ppm | ASTM D5185(m) | | **<1** | --- | --- |

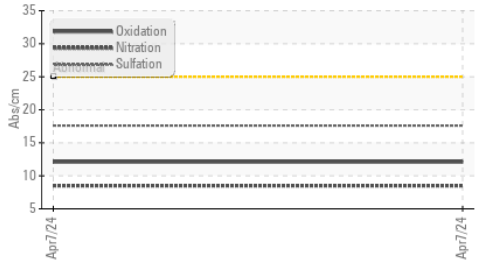
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185(m) | | **148** | --- | --- |
| Barium | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Molybdenum | ppm | ASTM D5185(m) | | **47** | --- | --- |
| Manganese | ppm | ASTM D5185(m) | | **9** | --- | --- |
| Magnesium | ppm | ASTM D5185(m) | | **44** | --- | --- |
| Calcium | ppm | ASTM D5185(m) | | **2009** | --- | --- |
| Phosphorus | ppm | ASTM D5185(m) | | **665** | --- | --- |
| Zinc | ppm | ASTM D5185(m) | | **784** | --- | --- |
| Sulfur | ppm | ASTM D5185(m) | | **2589** | --- | --- |
| Lithium | ppm | ASTM D5185(m) | | **<1** | --- | --- |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185(m) | >20 | **23** | --- | --- |
| Sodium | ppm | ASTM D5185(m) | >75 | **8** | --- | --- |
| Potassium | ppm | ASTM D5185(m) | >20 | **<1** | --- | --- |

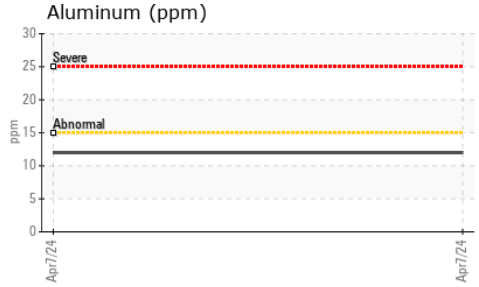
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | ASTM D7844* | | **0** | --- | --- |
| Nitration | Abs/cm | ASTM D7624* | >20 | **8.5** | --- | --- |
| Sulfation | Abs/.1mm | ASTM D7415* | >30 | **17.6** | --- | --- |

# OIL ANALYSIS REPORT

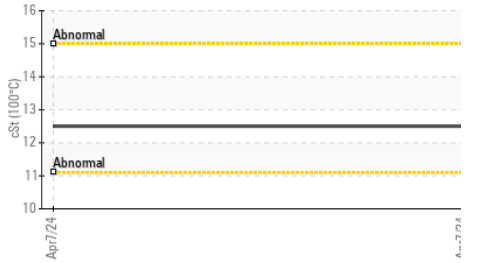
FT-IR (Direct Trend)



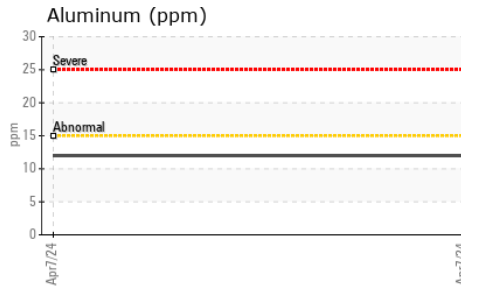

Aluminum (ppm)



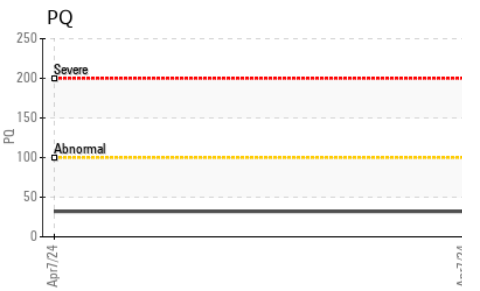

Viscosity @ 100°C




Aluminum (ppm)




PQ



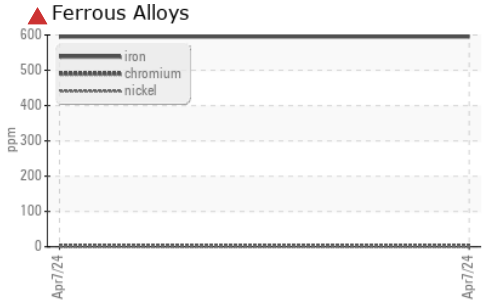

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | ASTM D7414* | >25 | **12.1** | --- | --- |

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | Visual* | NONE | **VLITE** | --- | --- |
| Yellow Metal | scalar | Visual* | NONE | **NONE** | --- | --- |
| Precipitate | scalar | Visual* | NONE | **NONE** | --- | --- |
| Silt | scalar | Visual* | NONE | **NONE** | --- | --- |
| Debris | scalar | Visual* | NONE | **NONE** | --- | --- |
| Sand/Dirt | scalar | Visual* | NONE | **NONE** | --- | --- |
| Appearance | scalar | Visual* | NORML | **NORML** | --- | --- |
| Odor | scalar | Visual* | NORML | **NORML** | --- | --- |
| Emulsified Water | scalar | Visual* | >0.1 | **NEG** | --- | --- |
| Free Water | scalar | Visual* | | **NEG** | --- | --- |

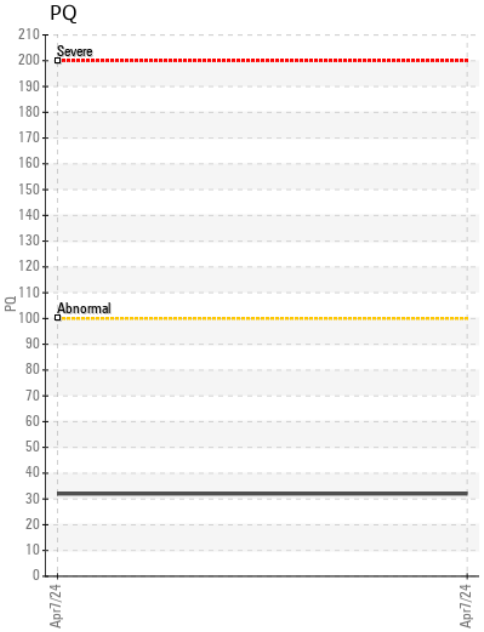
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D7279(m) | | **12.5** | --- | --- |

## GRAPHS

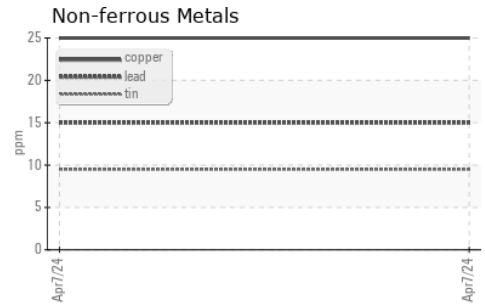
Ferrous Alloys



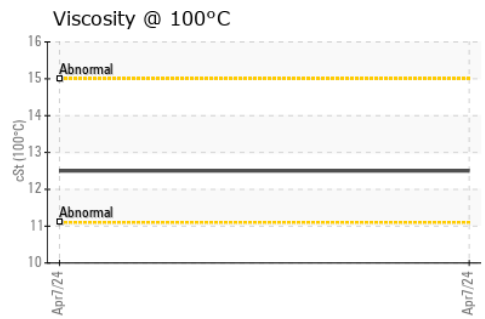

PQ




Non-ferrous Metals




Viscosity @ 100°C




ISO 17025:2017 Accredited Laboratory

**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
**Sample No.** : PP
**Lab Number** : 02646082
**Unique Number** : 5811634
**Test Package** : MAR 1 ( Additional Tests: BottomAnalysis, FILTERPATCH, PQ )
**Received** : 08 Jul 2024
**Tested** : 11 Jul 2024
**Diagnosed** : 11 Jul 2024 - Kevin Marson

*To discuss this sample report, contact Customer Service at 1-800-268-2131.*
*Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.*
*Validity of results and interpretation are based on the sample and information as supplied.*

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