

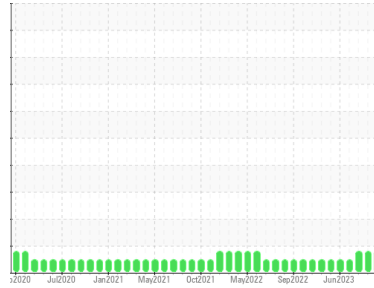


PROBLEM SUMMARY



Area
Map Runner
 Machine Id
[Map Runner] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
DIESEL ENGINE OIL SAE 15W40 (37 GAL)

Sample Rating Trend

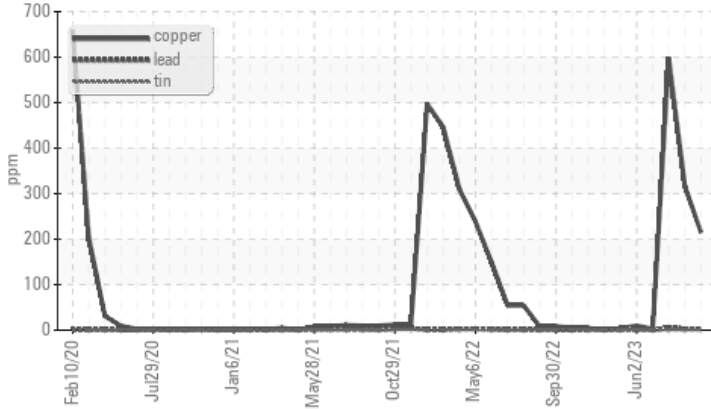


WEAR



COMPONENT CONDITION SUMMARY

▲ Non-ferrous Metals



RECOMMENDATION

No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: Scheduled to be changed 9-28-23)

PROBLEMATIC TEST RESULTS

Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
Copper	ppm	ASTM D5185m	>80	▲ 215	▲ 316	▲ 598

Customer Id: MARCAT
 Sample No.: WC0719211
 Lab Number: 05966526
 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data:
 Don Baldrige +1
don.b505@comcast.net

To change component or sample information:
 Customer Service +1 1-800-237-1369
customerservice@wearcheck.com

RECOMMENDED ACTIONS

There are no recommended actions for this sample.

HISTORICAL DIAGNOSIS

30 Aug 2023 Diag: Sean Felton

WEAR



No corrective action is recommended at this time. The filter change at the time of sampling has been noted. Resample at the next service interval to monitor. The copper level has decreased, but is still abnormal. Elemental level of copper (Cu) probably due to leaching of copper from copper components (i.e. cooling core) by the oil additives. All other component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report



27 Jul 2023 Diag: Don Baldrige

WEAR



Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor. The copper level is abnormal. Elemental level of copper (Cu) probably due to leaching of copper from copper components (i.e. cooling core) by the oil additives. All other component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report



30 Jun 2023 Diag: Sean Felton

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report



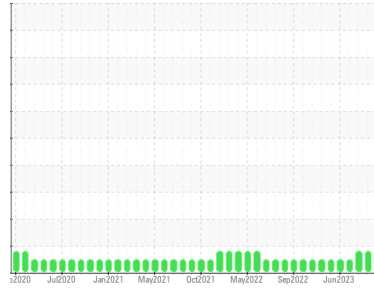


OIL ANALYSIS REPORT



Area
Map Runner
 Machine Id
[Map Runner] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
DIESEL ENGINE OIL SAE 15W40 (37 GAL)

Sample Rating Trend



WEAR



DIAGNOSIS

▲ Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: Scheduled to be changed 9-28-23)

▲ Wear

The copper level has decreased, but is still abnormal. Elemental level of copper (Cu) probably due to leaching of copper from copper components (i.e. cooling core) by the oil additives. All other 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		WC0719211	WC0805266	WC0735453
Sample Date	Client Info		27 Sep 2023	30 Aug 2023	27 Jul 2023
Machine Age	hrs	Client Info	2867	2267	1554
Oil Age	hrs	Client Info	1313	713	1097
Oil Changed	Client Info		Not Chngd	Oil Added	Changed
Sample Status			ABNORMAL	ABNORMAL	ABNORMAL

CONTAMINATION

	method	limit/base	current	history1	history2
Fuel	WC Method	>4.0	<1.0	<1.0	<1.0

WEAR METALS

	method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m	>75	21	11	13
Chromium	ppm	ASTM D5185m	>8	0	0	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>3	<1	<1	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	<1	<1	<1
Lead	ppm	ASTM D5185m	>18	3	3	6
Copper	ppm	ASTM D5185m	>80	▲ 215	▲ 316	▲ 598
Tin	ppm	ASTM D5185m	>14	<1	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		0	0	0

ADDITIVES

	method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185m	250	2	3	26
Barium	ppm	ASTM D5185m	10	0	0	0
Molybdenum	ppm	ASTM D5185m	100	66	65	66
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m	450	1560	1516	1490
Calcium	ppm	ASTM D5185m	3000	1224	1221	1200
Phosphorus	ppm	ASTM D5185m	1150	1054	1083	997
Zinc	ppm	ASTM D5185m	1350	1358	1307	1202
Sulfur	ppm	ASTM D5185m	4250	3057	3963	3729

CONTAMINANTS

	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185m	>20	4	3	3
Sodium	ppm	ASTM D5185m	>158	3	3	5
Potassium	ppm	ASTM D5185m	>20	<1	0	1
Glycol	%	*ASTM D2982		NEG	NEG	NEG

INFRA-RED

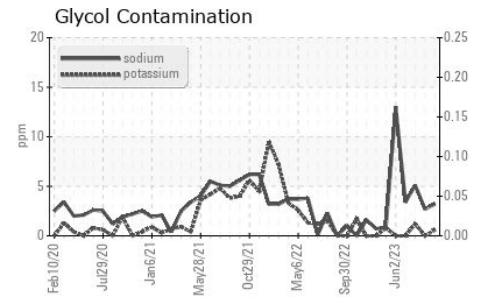
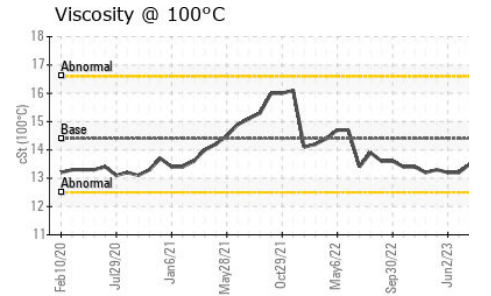
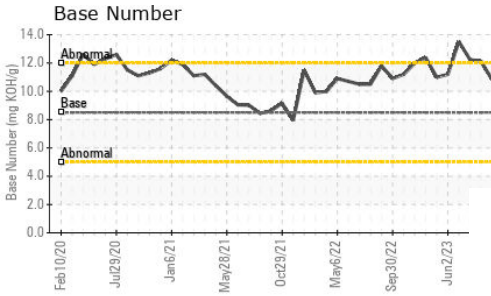
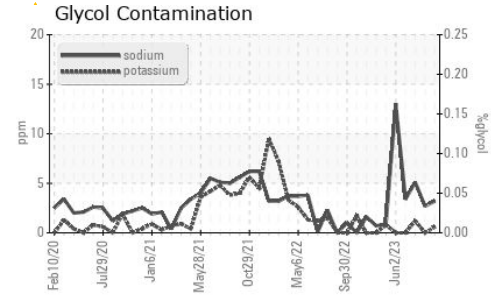
	method	limit/base	current	history1	history2	
Soot %	%	*ASTM D7844		0.4	0.2	0.3
Nitration	Abs/cm	*ASTM D7624	>20	9.6	8.4	8.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	22.2	20.9	18.7

FLUID DEGRADATION

	method	limit/base	current	history1	history2	
Oxidation	Abs/.1mm	*ASTM D7414	>25	19.5	17.0	14.5
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	10.83	12.11	12.24



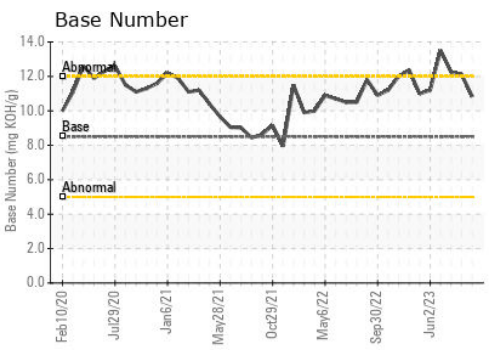
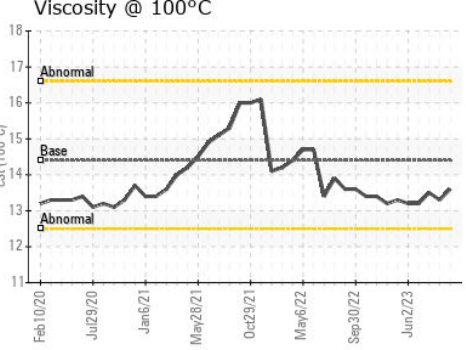
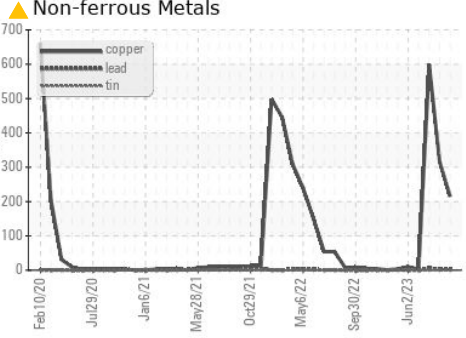
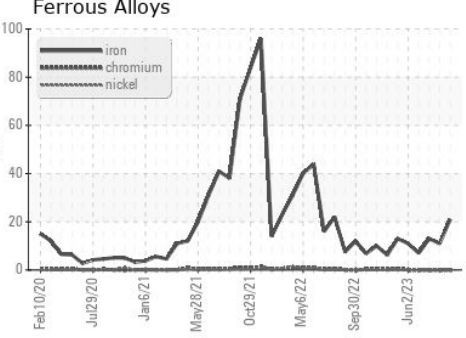
OIL ANALYSIS REPORT



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

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.6	13.3

GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0719211 **Received** : 02 Oct 2023
Lab Number : 05966526 **Diagnosed** : 04 Oct 2023
Unique Number : 10673077 **Diagnostician** : Don Baldrige
Test Package : IND 2 (Additional Tests: Glycol)

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Certificate L2367
 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)