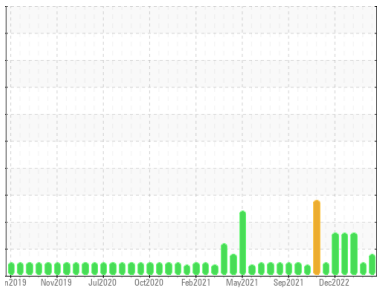
OIL ANALYSIS REPORT

Sample Rating Trend



FUEL

Area
Marathon
Machine Id
[Marathon] Oil - Starboard Genset
Component
Starboard Genset
Fluid
DIESEL ENGINE OIL SAE 15W40 (35 GAL)

DIAGNOSIS

Recommendation
No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: Chris Comuzie)

Wear
All component wear rates are normal.

Contamination
There is a light concentration of water present 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		**WC0846111**	WC0769285	WC0735258
Sample Date		Client Info		**31 Mar 2024**	25 Sep 2023	09 Apr 2023
Machine Age	hrs	Client Info		**7958**	5349	3286
Oil Age	hrs	Client Info		**7958**	5349	3286
Oil Changed		Client Info		**Filtered**	N/A	Oil Added
Sample Status				**MARGINAL**	NORMAL	ABNORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Glycol		WC Method		**NEG**	NEG	NEG

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>50	**37**	46	▲ 49
Chromium	ppm	ASTM D5185m	>4	**<1**	<1	<1
Nickel	ppm	ASTM D5185m	>2	**0**	0	0
Titanium	ppm	ASTM D5185m		**<1**	2	0
Silver	ppm	ASTM D5185m	>5	**0**	0	0
Aluminum	ppm	ASTM D5185m	>12	**3**	2	0
Lead	ppm	ASTM D5185m	>17	**3**	2	1
Copper	ppm	ASTM D5185m	>70	**2**	21	▲ 92
Tin	ppm	ASTM D5185m	>15	**<1**	1	1
Vanadium	ppm	ASTM D5185m		**0**	<1	0
Cadmium	ppm	ASTM D5185m		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	250	**199**	145	58
Barium	ppm	ASTM D5185m	10	**0**	0	0
Molybdenum	ppm	ASTM D5185m	100	**130**	108	35
Manganese	ppm	ASTM D5185m		**<1**	1	<1
Magnesium	ppm	ASTM D5185m	450	**732**	763	753
Calcium	ppm	ASTM D5185m	3000	**1548**	1685	1834
Phosphorus	ppm	ASTM D5185m	1150	**732**	759	1069
Zinc	ppm	ASTM D5185m	1350	**885**	1003	1349
Sulfur	ppm	ASTM D5185m	4250	**2928**	2500	2670

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>25	**5**	6	7
Sodium	ppm	ASTM D5185m	>158	**5**	5	5
Potassium	ppm	ASTM D5185m	>20	**<1**	1	6
Fuel	%	ASTM D3524	>4.0	▲ **2.2**	<1.0	<1.0
Water	%	ASTM D6304	>0.1	**NEG**	NEG	NEG

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		**0.4**	0.3	0.3
Nitration	Abs/cm	*ASTM D7624	>20	**10.6**	11.1	9.6
Sulfation	Abs/.1mm	*ASTM D7415	>30	**24.1**	24.2	20.4

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	**21.7**	23.1	20.4
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	**7.88**	7.87	8.24

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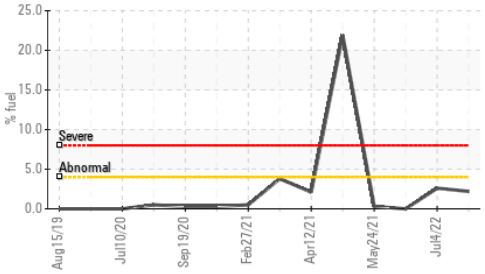
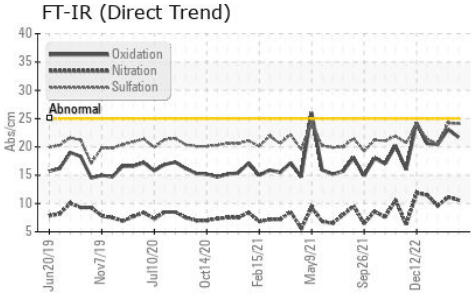
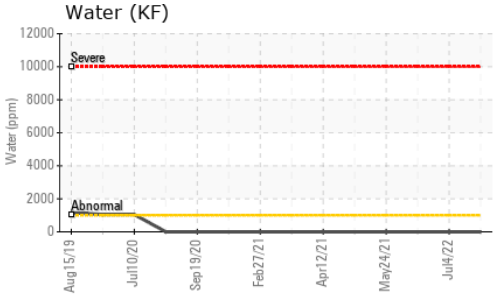
Fuel Dilution



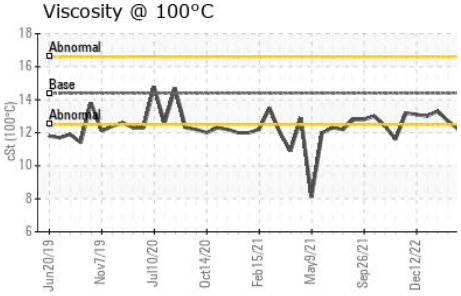
FT-IR (Direct Trend)



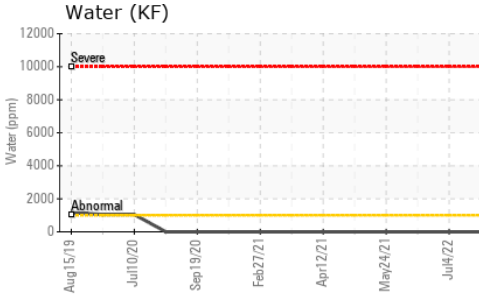
Water (KF)



Viscosity @ 100°C



Water (KF)

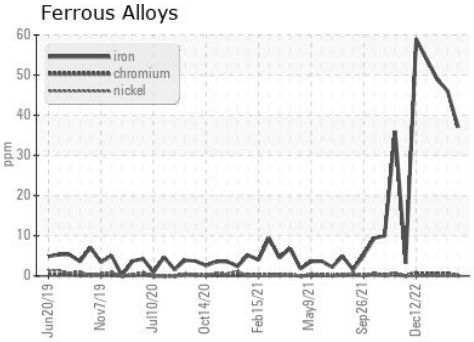


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt	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

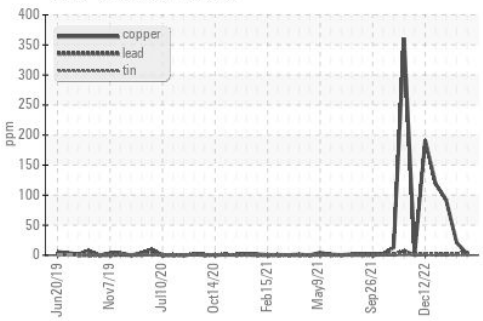
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	**12.2**	12.7	13.3

GRAPHS

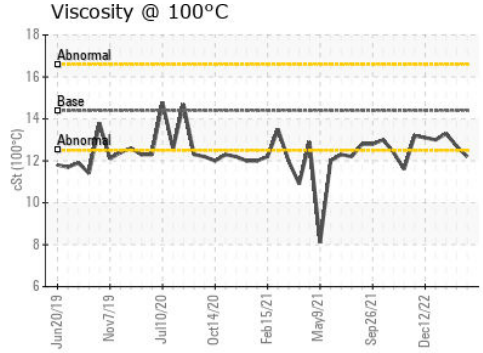
Ferrous Alloys



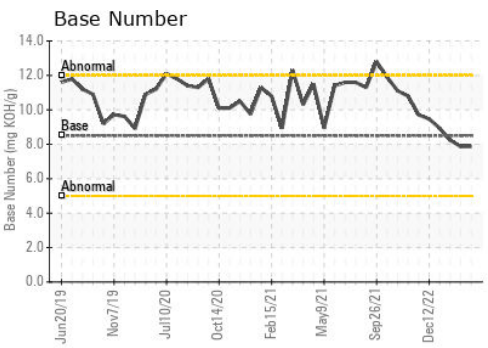
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0846111 **Received** : 23 Apr 2024
Lab Number : 06157877 **Tested** : 25 Apr 2024
Unique Number : 10993300 **Diagnosed** : 25 Apr 2024 - Sean Felton
Test Package : IND 2 (Additional Tests: FuelDilution, KF, PercentFuel)

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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Report Id: MARCAT [WUSCAR] 06157877 (Generated: 04/25/2024 12:25:13) Rev: 1

Submitted By: M/V MARATHON