MAR II

WEAR CHECK Inland Marine Oil Analysis Program

OIL ANALYSIS REPORT

WEAR	ABNORMAL
CONTAMINATION	MARGINAL
FLUID CONDITION	ABNORMAL

Machine Id
LUDLOW
Component
Starboard Genset
Fluid
DIESEL ENGINE OIL SAE 15W40 (4 GAL)

RECOMMENDATION

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

WEAR

The copper level is abnormal. Cylinder, crank, or cam shaft wear is indicated. In the absence of other significant wear metals, suspect copper due to sources other than wear (i.e. cooling core).

CONTAMINATION

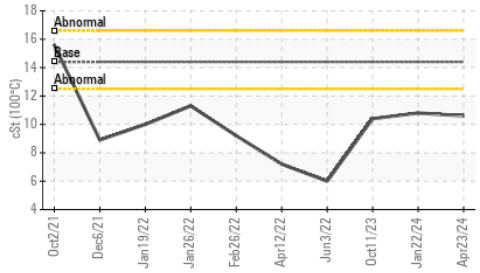
Light fuel dilution occurring.

FLUID CONDITION

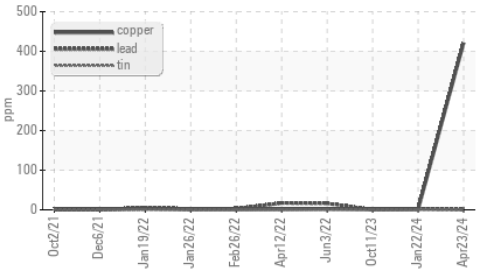
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		MW0062720	MW0048263	MW0048259
Sample Date		Client Info		23 Apr 2024	22 Jan 2024	11 Oct 2023
Machine Age	hrs	Client Info		19951	19377	18550
Oil Age	hrs	Client Info		500	500	250
Filter Age	hrs	Client Info		500	500	250
Oil Changed		Client Info		Changed	Changed	Changed
Filter Changed		Client Info		Changed	Changed	Changed
Sample Status				ABNORMAL	SEVERE	SEVERE
Iron	ppm	ASTM D5185m	>50	▲ 144	28	5
Chromium	ppm	ASTM D5185m	>4	2	1	<1
Nickel	ppm	ASTM D5185m	>2	<1	0	0
Titanium	ppm	ASTM D5185m		<1	0	<1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>12	4	5	3
Lead	ppm	ASTM D5185m	>17	<1	3	<1
Copper	ppm	ASTM D5185m	>70	▲ 421	<1	<1
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	<1
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Silicon	ppm	ASTM D5185m	>25	7	5	4
Potassium	ppm	ASTM D5185m	>20	2	0	<1
Fuel	%	ASTM D3524	>4.0	▲ 3.4	▲ 14.6	▲ 13.7
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844		0.1	0.8	0.1
Nitration	Abs/cm	*ASTM D7624	>20	5.4	13.4	8.0
Sulfation	Abs/.1mm	*ASTM D7415	>30	23.2	24.9	21.8
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
Sodium	ppm	ASTM D5185m	>158	<1	1	2
Boron	ppm	ASTM D5185m	250	498	307	323
Barium	ppm	ASTM D5185m	10	<1	0	4
Molybdenum	ppm	ASTM D5185m	100	130	131	105
Manganese	ppm	ASTM D5185m		2	<1	<1
Magnesium	ppm	ASTM D5185m	450	648	717	536
Calcium	ppm	ASTM D5185m	3000	1531	1622	1278
Phosphorus	ppm	ASTM D5185m	1150	786	690	580
Zinc	ppm	ASTM D5185m	1350	853	859	▲ 657
Sulfur	ppm	ASTM D5185m	4250	2782	2195	1892
Oxidation	Abs/.1mm	*ASTM D7414	>25	15.7	24.9	18.6
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.8	9.1	8.2
Visc @ 100°C	cSt	ASTM D445	14.4	▲ 10.6	▲ 10.8	▲ 10.4

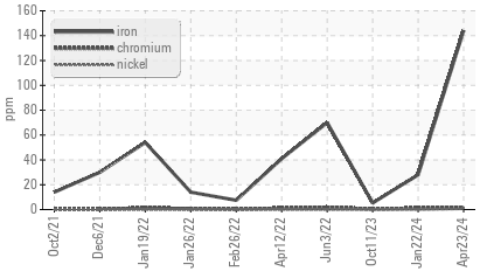
Viscosity @ 100°C



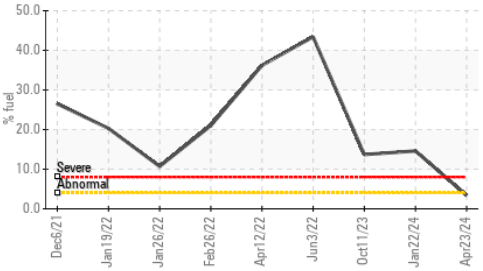
Non-ferrous Metals



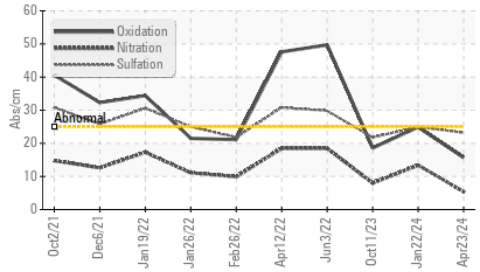
Ferrous Alloys



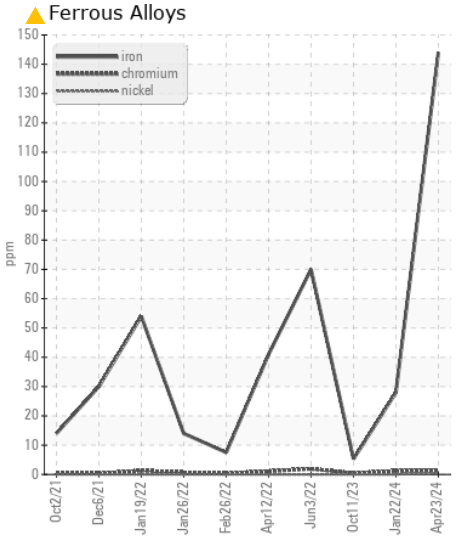
Fuel Dilution



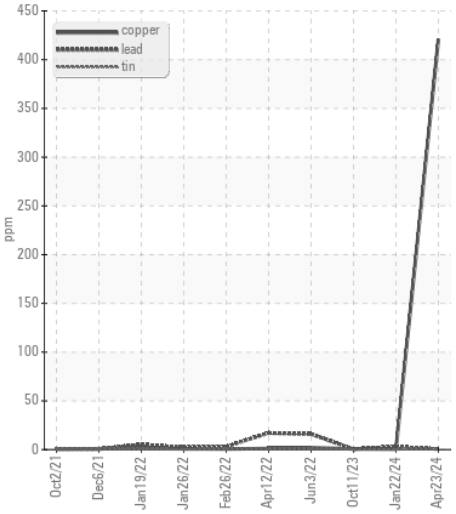
FT-IR (Direct Trend)



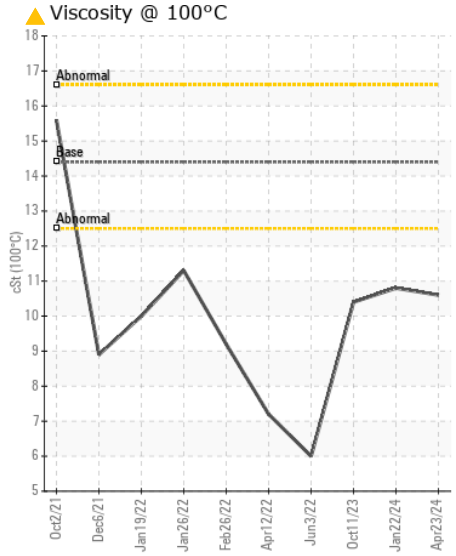
Ferrous Alloys



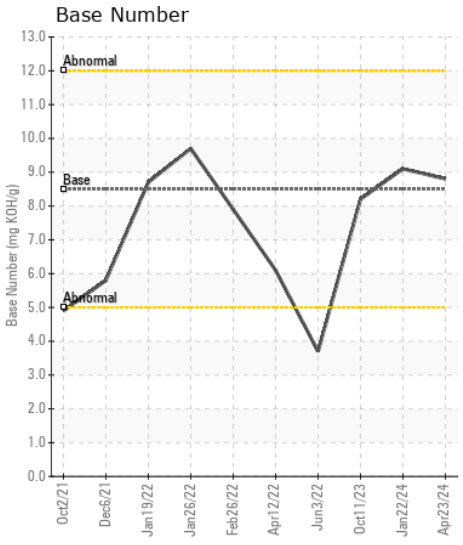
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MW0062720
Lab Number : 06174868
Unique Number : 11020921
Test Package : MAR 2 (Additional Tests: PercentFuel)

Received : 09 May 2024
Tested : 20 May 2024
Diagnosed : 20 May 2024 - Jonathan Hester

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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