MAR II

WEAR CHECK
Inland Marine Oil Analysis Program

OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	MARGINAL
FLUID CONDITION	ABNORMAL

Machine Id
LOUISIANA HERITAGE
Component
Starboard Main Engine
Fluid
CHEVRON DELO 400 MULTIGRADE 15W40 (44 GAL)

RECOMMENDATION

We advise that you check the cylinder liner seals for deterioration to ensure that cooling water is not entering the sump. The oil change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. No other corrective action is recommended at this time.

WEAR

All component wear rates are normal.

CONTAMINATION

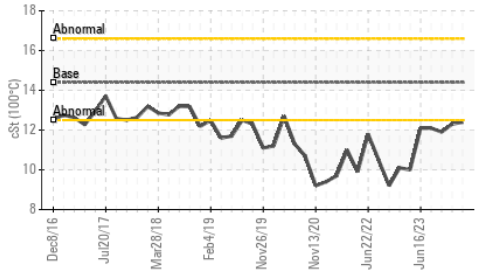
Elemental level of sodium (Na) and/or boron (B) indicates a possible cooling water leak. Light fuel dilution occurring. No other contaminants were detected in the oil.

FLUID CONDITION

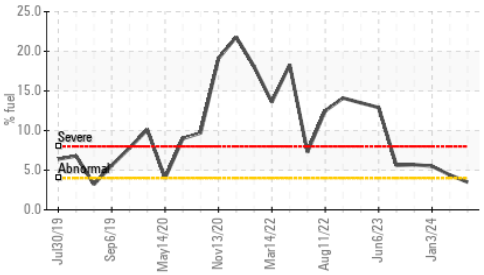
The BN result indicates that there is suitable alkalinity remaining in the oil. This plus the additive levels indicates that this is not the same brand, or type of oil as reported. The condition of the oil is suitable for further service.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		MW0052232	MW0052127	MW0052250
Sample Date		Client Info		23 May 2024	13 Mar 2024	03 Jan 2024
Machine Age	hrs	Client Info		39151	37652	36130
Oil Age	hrs	Client Info		1533	1517	1556
Filter Age	hrs	Client Info		1533	1517	1556
Oil Changed		Client Info		Changed	Changed	Changed
Filter Changed		Client Info		Changed	Changed	Changed
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
Iron	ppm	ASTM D5185m	>75	10	10	11
Chromium	ppm	ASTM D5185m	>8	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	0	<1
Titanium	ppm	ASTM D5185m	>3	12	13	13
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	0	<1	1
Lead	ppm	ASTM D5185m	>18	<1	2	4
Copper	ppm	ASTM D5185m	>80	0	<1	3
Tin	ppm	ASTM D5185m	>14	0	0	1
Vanadium	ppm	ASTM D5185m		0	<1	<1
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Silicon	ppm	ASTM D5185m	>20	3	3	4
Potassium	ppm	ASTM D5185m	>20	2	2	2
Fuel	%	ASTM D3524	>4.0	▲ 3.5	▲ 4.4	▲ 5.5
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844		0.4	0.4	0.3
Nitration	Abs/cm	*ASTM D7624	>20	10.0	9.9	9.6
Sulfation	Abs/.1mm	*ASTM D7415	>30	20.0	19.7	19.4
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	>75	6	9	6
Boron	ppm	ASTM D5185m	151	● 65	67	74
Barium	ppm	ASTM D5185m	0.4	0	0	0
Molybdenum	ppm	ASTM D5185m	250	● 26	27	32
Manganese	ppm	ASTM D5185m		0	<1	<1
Magnesium	ppm	ASTM D5185m	0	627	620	691
Calcium	ppm	ASTM D5185m	2046	1525	1639	1767
Phosphorus	ppm	ASTM D5185m	1043	707	719	804
Zinc	ppm	ASTM D5185m	943	817	807	961
Sulfur	ppm	ASTM D5185m	5012	3252	3471	3444
Oxidation	Abs/.1mm	*ASTM D7414	>25	16.1	16.1	15.9
Base Number (BN)	mg KOH/g	ASTM D2896	12.5	7.5	7.4	7.6
Visc @ 100°C	cSt	ASTM D445	14.4	▲ 12.4	▲ 12.3	▲ 11.9

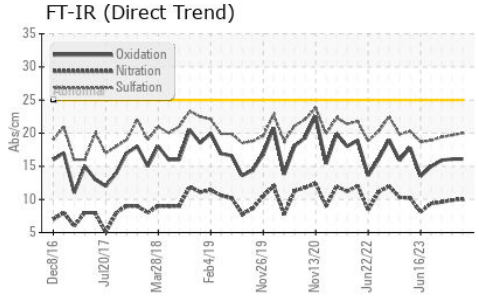
Viscosity @ 100°C



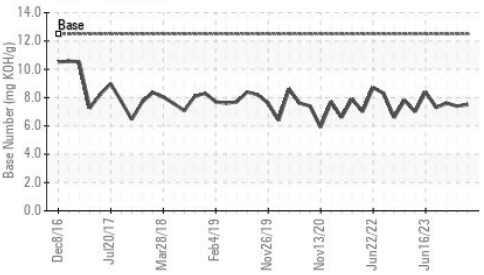
Fuel Dilution



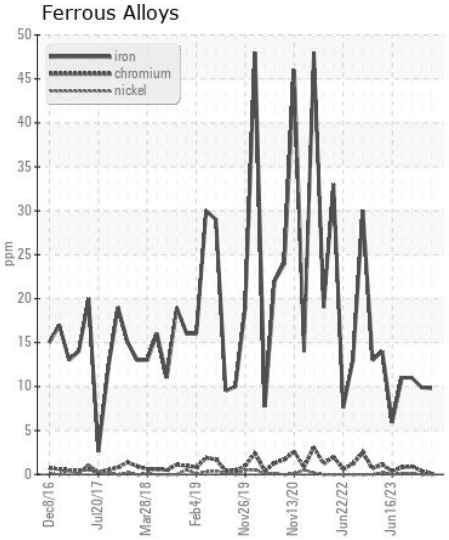
FT-IR (Direct Trend)



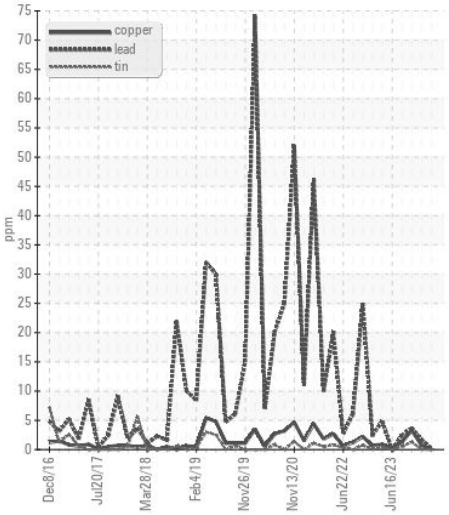
Base Number



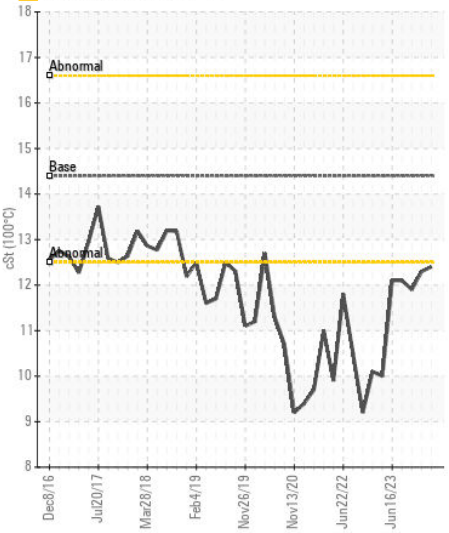
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 100°C



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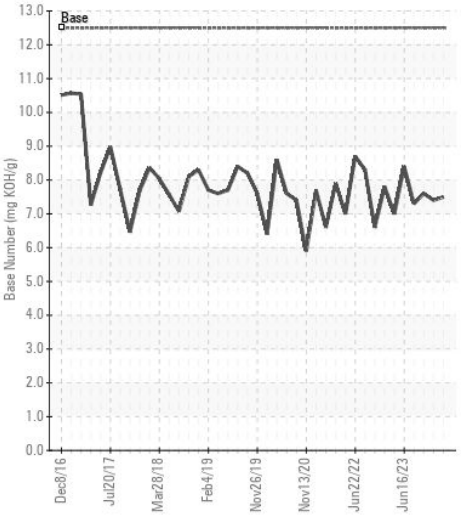

Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MW0052232
Lab Number : 06195224
Unique Number : 11057347
Test Package : MAR 2 (Additional Tests: PercentFuel)

Received : 30 May 2024
Tested : 03 Jun 2024
Diagnosed : 03 Jun 2024 - 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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