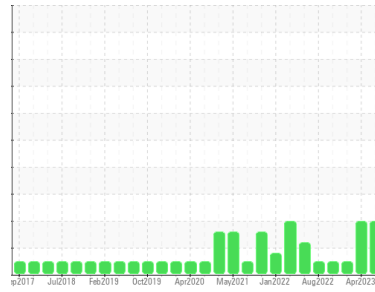




OIL ANALYSIS REPORT

Sample Rating Trend



ISO



Machine Id

NORTHERN LIGHTS X6

Component

Starboard Genset

Fluid

CHEVRON DELO 400 MULTIGRADE 15W40 (5 QTS)

DIAGNOSIS

Recommendation

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.

Wear

All component wear rates are normal.

Contamination

There is a moderate amount of particulates 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		KL0013493	KL0008982	KL0008975
Sample Date	Client Info		30 Apr 2024	20 Apr 2023	28 Dec 2022
Machine Age	hrs	Client Info	13668	11827	12942
Oil Age	hrs	Client Info	270	448	437
Oil Changed	Client Info		Changed	Changed	Changed
Sample Status			ATTENTION	ABNORMAL	NORMAL

CONTAMINATION

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

WEAR METALS

	method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m	>50	9	14	15
Chromium	ppm	ASTM D5185m	>4	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>5	<1	0	0
Aluminum	ppm	ASTM D5185m	>12	2	2	2
Lead	ppm	ASTM D5185m	>17	<1	0	0
Copper	ppm	ASTM D5185m	>70	4	<1	1
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0

ADDITIVES

	method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185m		63	33	49
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		6	<1	<1
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m		792	819	765
Calcium	ppm	ASTM D5185m		1397	1474	1504
Phosphorus	ppm	ASTM D5185m	1360	781	745	719
Zinc	ppm	ASTM D5185m	1480	911	911	837
Sulfur	ppm	ASTM D5185m		3389	3648	3416

CONTAMINANTS

	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185m	>25	6	6	5
Sodium	ppm	ASTM D5185m		2	3	3
Potassium	ppm	ASTM D5185m	>20	5	3	<1

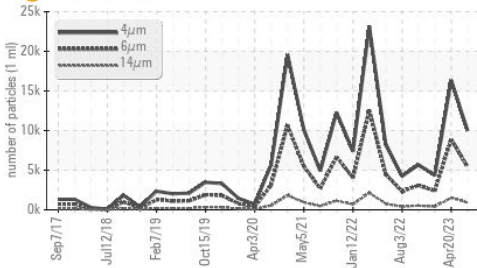
INFRA-RED

	method	limit/base	current	history1	history2	
Soot %	%	*ASTM D7844		0.5	0.9	0.9
Nitration	Abs/cm	*ASTM D7624	>20	9.0	10.6	9.9
Sulfation	Abs./1mm	*ASTM D7415	>30	19.0	21.1	20.4

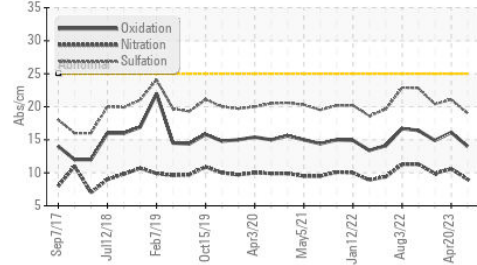


OIL ANALYSIS REPORT

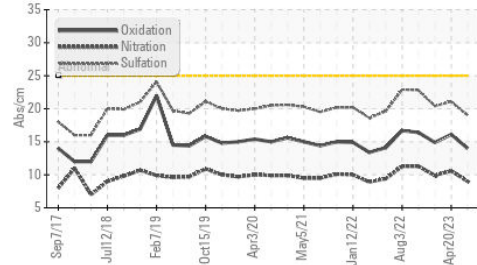
● Particle Trend



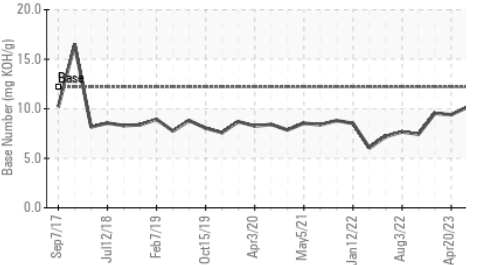
FT-IR (Direct Trend)



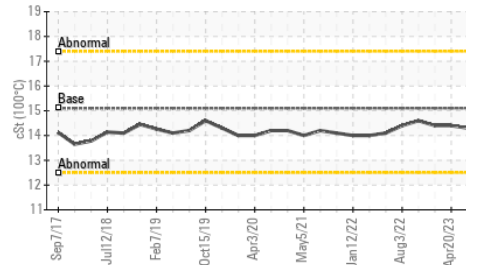
FT-IR (Direct Trend)



Base Number



Viscosity @ 100°C



FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		9978	16321	4356
Particles >6µm	ASTM D7647	>5000	● 5436	▲ 8891	2373
Particles >14µm	ASTM D7647	>640	● 925	▲ 1513	404
Particles >21µm	ASTM D7647	>160	● 312	▲ 510	136
Particles >38µm	ASTM D7647	>40	● 48	▲ 79	21
Particles >71µm	ASTM D7647	>10	● 5	▲ 8	2
Oil Cleanliness	ISO 4406 (c)	>19/16	● 20/17	▲ 20/18	18/16

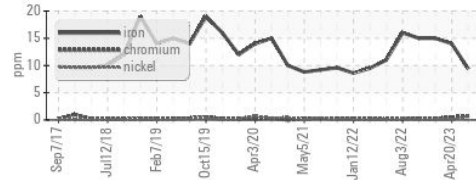
FLUID DEGRADATION	method	limit/base	current	history1	history2
Oxidation	Abs./1mm *ASTM D7414	>25	14.0	16.1	14.9
Base Number (BN)	mg KOH/g ASTM D2896	12.2	10.18	9.40	9.54

VISUAL	method	limit/base	current	history1	history2
White Metal	scalar *Visual	NONE	NONE	NONE	NONE
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

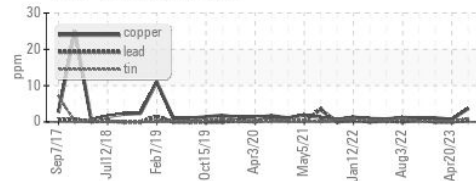
FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt ASTM D445	15.1	14.3	14.4	14.4

GRAPHS

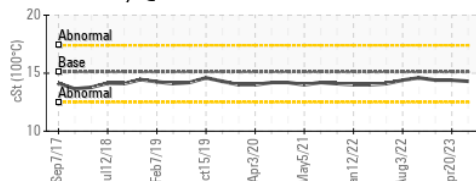
Ferrous Alloys



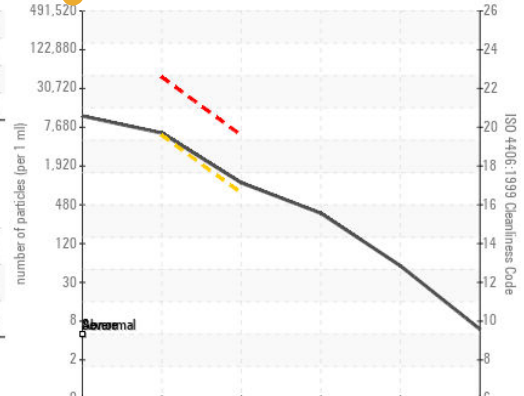
Non-ferrous Metals



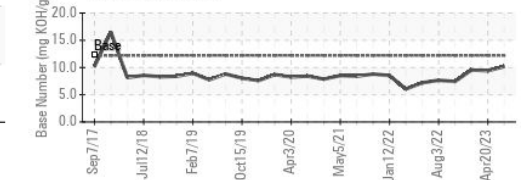
Viscosity @ 100°C



● Particle Count



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : KL0013493

Lab Number : **06183446**

Unique Number : 11034772

Test Package : MOB 2 (Additional Tests: PrtCount)

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)

Received : 17 May 2024

Tested : 20 May 2024

Diagnosed : 21 May 2024 - Don Baldrige

EXPEDITIONS

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