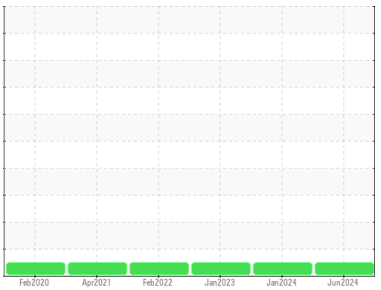
OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Machine Id
512100707
Component
Starboard Main Engine
Fluid
SHELL ROTELLA T4 15W40 (81 LTR)

DIAGNOSIS

Recommendation
Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

Wear
All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

Contaminants
There is no indication of any contamination in the oil.

Oil Condition
Additive levels indicate the addition of a different brand, or type of oil. 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		**WC0902724**	WC0857891	WC0771334
Sample Date		Client Info		**26 Jun 2024**	21 Jan 2024	15 Jan 2023
Machine Age	hrs	Client Info		**1850**	1744	1438
Oil Age	hrs	Client Info		**106**	306	390
Oil Changed		Client Info		**Not Changd**	Changed	Changed
Sample Status				**NORMAL**	NORMAL	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
PQ		ASTM D8184*		**0**	0	0
Iron	ppm	ASTM D5185(m)	>75	**6**	15	18
Chromium	ppm	ASTM D5185(m)	>8	**<1**	<1	<1
Nickel	ppm	ASTM D5185(m)	>2	**<1**	<1	<1
Titanium	ppm	ASTM D5185(m)	>3	**0**	0	<1
Silver	ppm	ASTM D5185(m)	>2	**0**	0	0
Aluminum	ppm	ASTM D5185(m)	>15	**1**	2	2
Lead	ppm	ASTM D5185(m)	>18	**0**	<1	1
Copper	ppm	ASTM D5185(m)	>80	**1**	2	3
Tin	ppm	ASTM D5185(m)	>14	**0**	<1	<1
Antimony	ppm	ASTM D5185(m)		**0**	0	<1
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

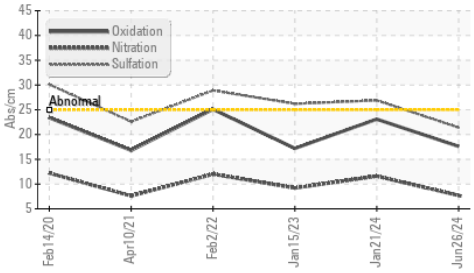
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**143**	71	69
Barium	ppm	ASTM D5185(m)		**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	<1
Manganese	ppm	ASTM D5185(m)		**0**	0	<1
Magnesium	ppm	ASTM D5185(m)		**12**	16	16
Calcium	ppm	ASTM D5185(m)		**2185**	2529	2715
Phosphorus	ppm	ASTM D5185(m)		**976**	1066	1155
Zinc	ppm	ASTM D5185(m)		**1160**	1297	1340
Sulfur	ppm	ASTM D5185(m)		**2947**	3165	3152
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>20	**4**	7	2
Sodium	ppm	ASTM D5185(m)	>75	**2**	2	3
Potassium	ppm	ASTM D5185(m)	>20	**7**	9	9

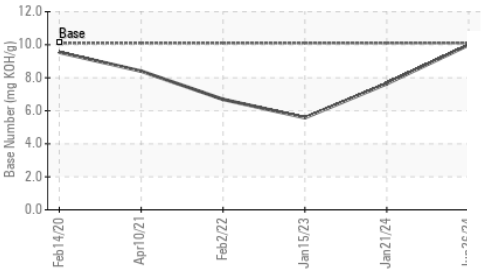
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*		**0.2**	0.7	0.4
Nitration	Abs/cm	ASTM D7624*	>20	**7.7**	11.6	9.2
Sulfation	Abs/.1mm	ASTM D7415*	>30	**21.4**	26.9	26.2

OIL ANALYSIS REPORT

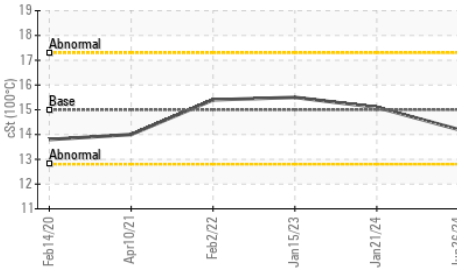
FT-IR (Direct Trend)



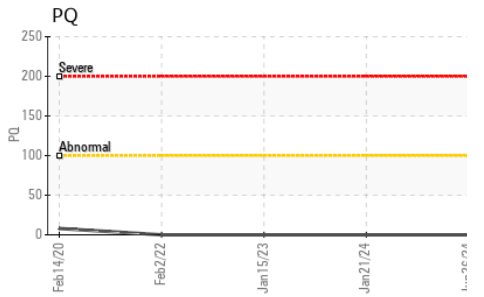
Base Number



Viscosity @ 100°C



PQ



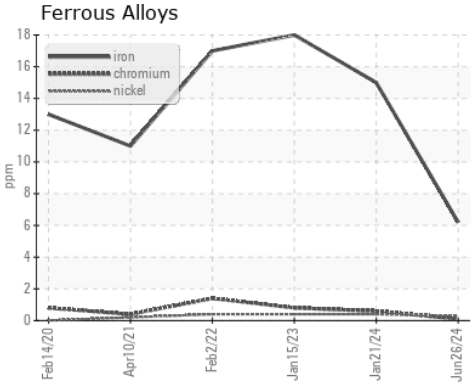
FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	**17.6**	23.1	17.2
Base Number (BN)	mg KOH/g	ASTM D2896*	10.1	**9.99**	7.64	5.58

VISUAL		method	limit/base	current	history1	history2
Emulsified Water	scalar	Visual*	>0.1	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

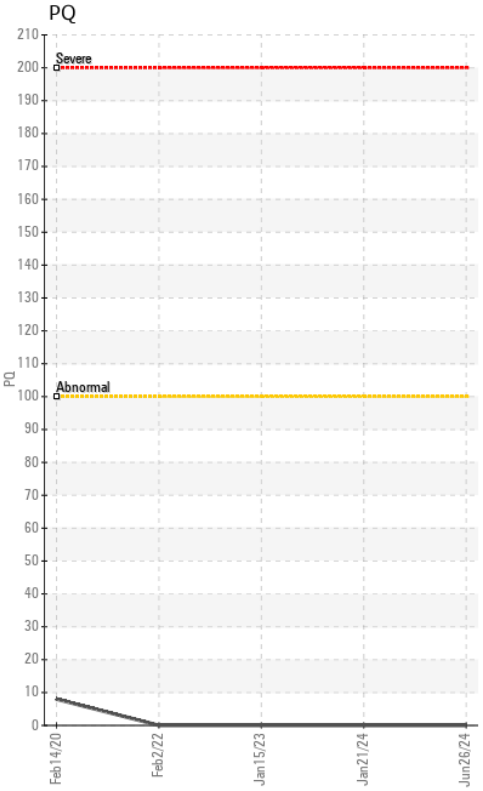
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D7279(m)	15	**14.2**	15.1	15.5

GRAPHS

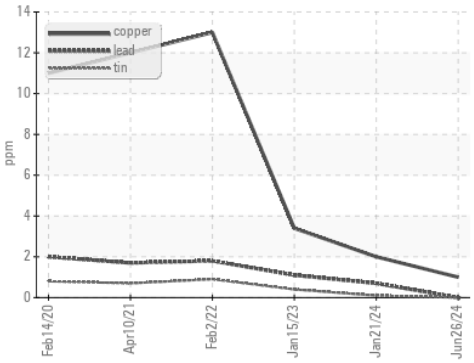
Ferrous Alloys



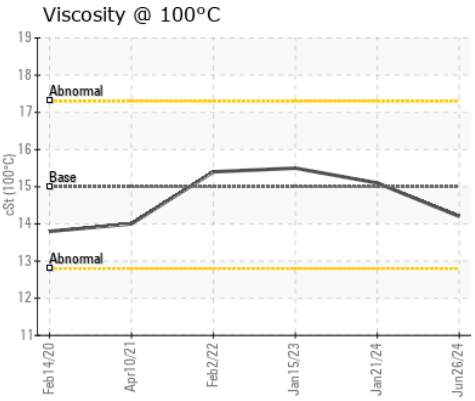
PQ



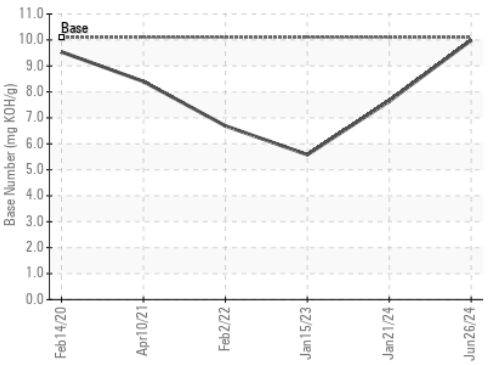
Non-ferrous Metals



Viscosity @ 100°C



Base Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0902724
Lab Number : 02646083
Unique Number : 5811635
Test Package : MAR 3

Received : 08 Jul 2024
Tested : 12 Jul 2024
Diagnosed : 12 Jul 2024 - Kevin Marson

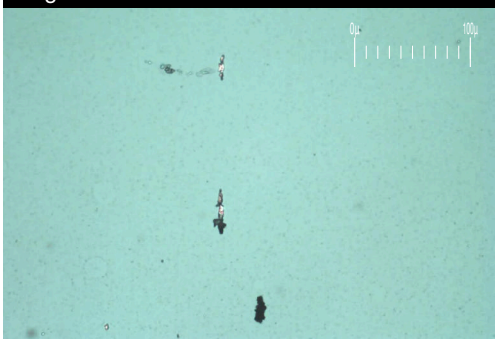
CCGS Sacred Bay
280 Southside Road,, P.O. BOX 5667
ST. JOHN`S, NL
CA A1C 5X1
Contact: Jody Walsh
walshjf@dfo-mpo.gc.ca
T: (709)693-7415
F:

To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

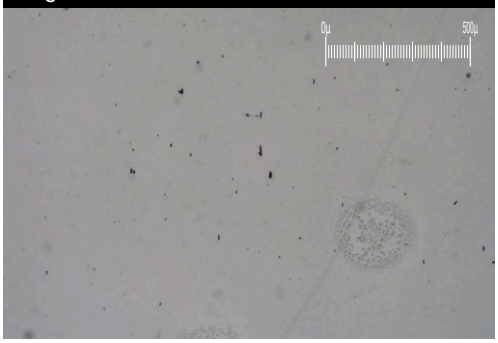
FERROGRAPHY REPORT

Machine Id
512100707
Component
Starboard Main Engine
Fluid
SHELL ROTELLA T4 15W40 (81 LTR)

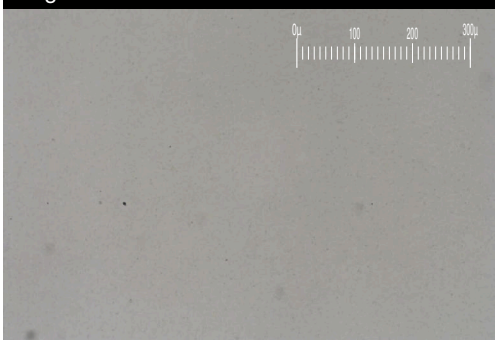
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW

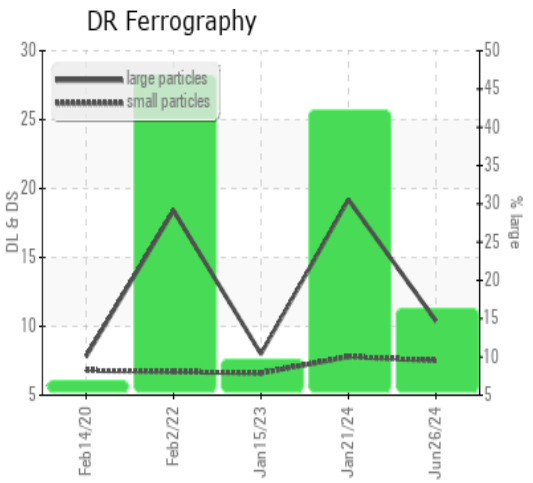


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**10.4**	19.2	8.0
Small Particles		DR-Ferr*		**7.5**	7.8	6.6
Total Particles		DR-Ferr*	>---	**17.9**	27	14.6
Large Particles Percentage	%	DR-Ferr*		**16.2**	42.2	9.6
Severity Index		DR-Ferr*		**30**	219	11

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		**1**	3	2
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		**1**	1	1
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*		**1**	1	
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		**1**	1	1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**1**	1	1

WEAR

All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.



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