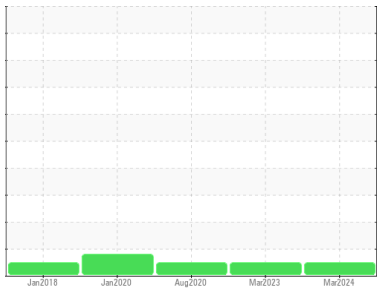
OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Machine Id
PH651-010-10 (S/N 2WB17757STBD)
Component
Starboard Diesel Engine
Fluid
DIESEL ENGINE OIL SAE 15W40 (68 LTR)

DIAGNOSIS

Recommendation
Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on 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
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		**WC0873833**	WC0797090	WC0442963
Sample Date		Client Info		**09 Mar 2024**	23 Mar 2023	18 Aug 2020
Machine Age	hrs	Client Info		**23568**	22603	20170
Oil Age	hrs	Client Info		**441**	476	464
Oil Changed		Client Info		**Not Changd**	Not Changd	Changed
Sample Status				**NORMAL**	NORMAL	NORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Fuel		WC Method	>5	**<1.0**	<1.0	<1.0
Water		WC Method	>0.2	**NEG**	NEG	NEG
Glycol		WC Method		**NEG**	NEG	NEG

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**0**	0	---
Iron	ppm	ASTM D5185(m)	>86	**5**	5	4
Chromium	ppm	ASTM D5185(m)	>3	**0**	0	<1
Nickel	ppm	ASTM D5185(m)	>3	**0**	0	<1
Titanium	ppm	ASTM D5185(m)	>2	**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)	>16	**<1**	4	3
Copper	ppm	ASTM D5185(m)	>250	**5**	10	74
Tin	ppm	ASTM D5185(m)	>2	**0**	<1	<1
Antimony	ppm	ASTM D5185(m)		**0**	<1	<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

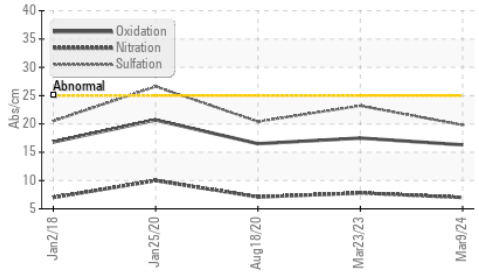
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	250	**1**	1	2
Barium	ppm	ASTM D5185(m)	10	**0**	0	<1
Molybdenum	ppm	ASTM D5185(m)	100	**60**	59	59
Manganese	ppm	ASTM D5185(m)		**0**	<1	<1
Magnesium	ppm	ASTM D5185(m)	450	**1011**	1013	1018
Calcium	ppm	ASTM D5185(m)	3000	**1062**	1144	1063
Phosphorus	ppm	ASTM D5185(m)	1150	**990**	1080	1017
Zinc	ppm	ASTM D5185(m)	1350	**1178**	1216	1267
Sulfur	ppm	ASTM D5185(m)	4250	**2581**	2591	2468
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>35	**<1**	2	2
Sodium	ppm	ASTM D5185(m)	>158	**1**	2	1
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	0

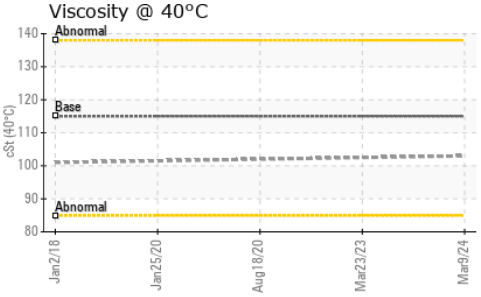
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*	>3	**0**	0	0
Nitration	Abs/cm	ASTM D7624*	>20	**7.0**	7.8	7.1
Sulfation	Abs/.1mm	ASTM D7415*	>30	**19.8**	23.2	20.4

OIL ANALYSIS REPORT

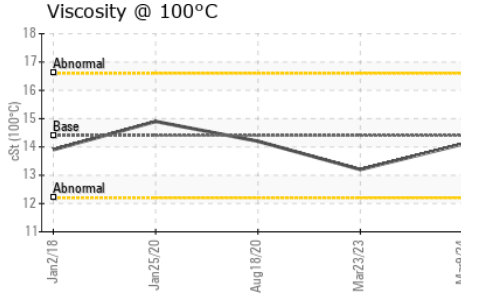
FT-IR (Direct Trend)



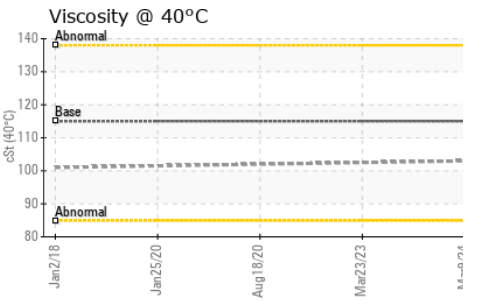
Viscosity @ 40°C



Viscosity @ 100°C



Viscosity @ 40°C



PQ

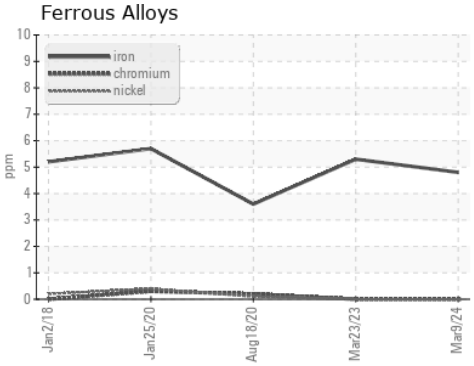
FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	**16.3**	17.5	16.5
Base Number (BN)	mg KOH/g	ASTM D2896*	8.5	**10.22**	9.19	---

VISUAL		method	limit/base	current	history1	history2
Emulsified Water	scalar	Visual*	>0.2	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

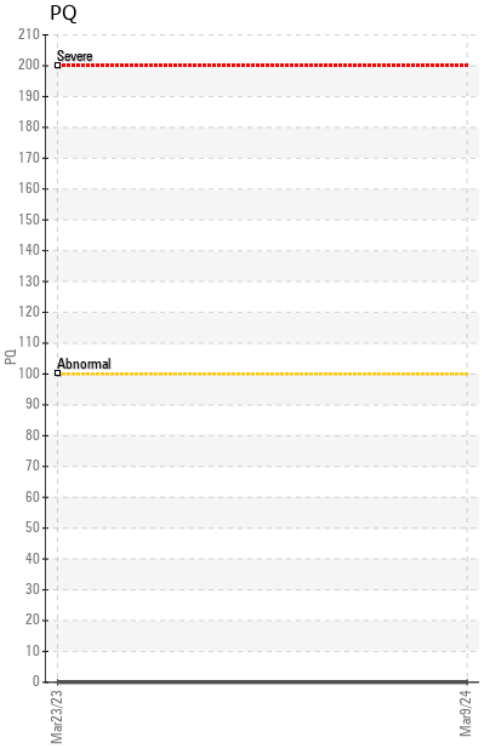
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	115	**103**	---	---
Visc @ 100°C	cSt	ASTM D7279(m)	14.4	**14.1**	13.2	14.2
Viscosity Index (VI)	Scale	ASTM D2270*	126	**139**	---	---

GRAPHS

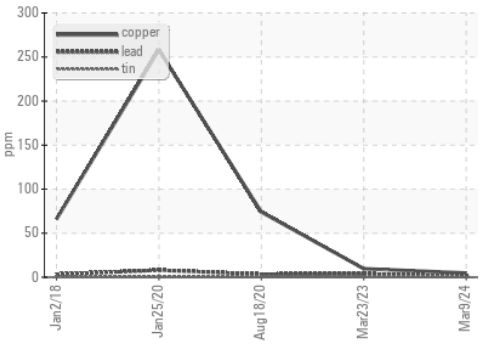
Ferrous Alloys



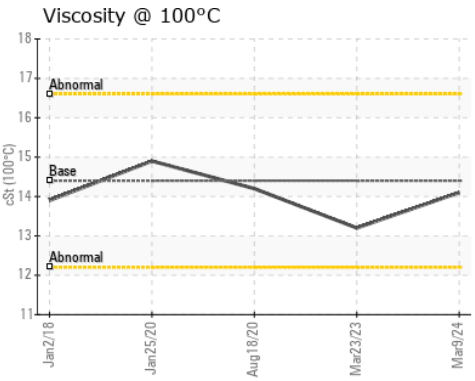
PQ



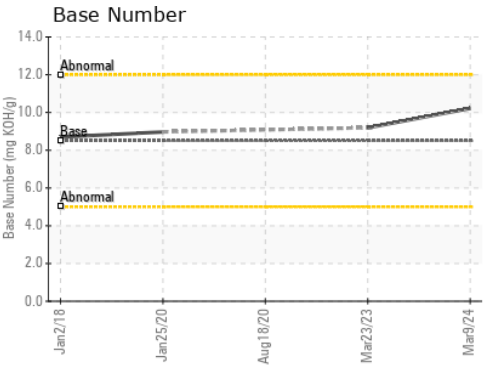
Non-ferrous Metals



Viscosity @ 100°C



Base Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0873833 **Received** : 05 Apr 2024
Lab Number : 02627106 **Tested** : 09 Apr 2024
Unique Number : 5760238 **Diagnosed** : 11 Apr 2024 - Kevin Marson
Test Package : MAR 3 (Additional Tests: KV40, VI)

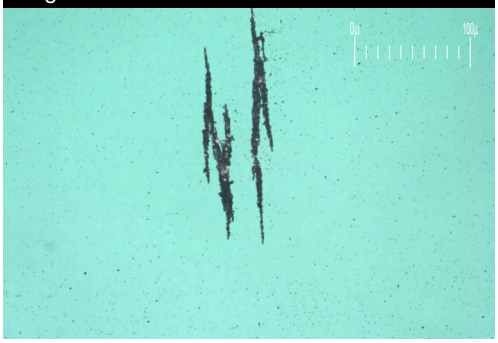
To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

CANSHIP UGLAND LTD.
PLACENTIA HOPE, P.O. BOX 8274, STN. A
ST. JOHN`S, NL
CA A1B 3N4
Contact: Brian Bishop
bbishop@canship.com
T: (709)782-7341
F: (709)782-0225

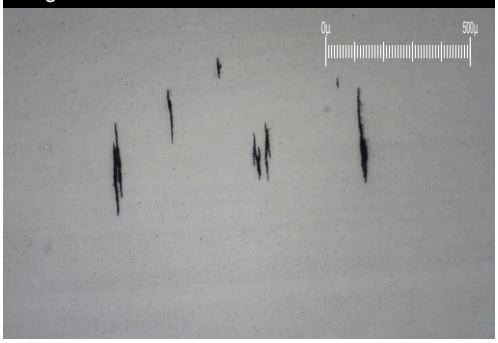
FERROGRAPHY REPORT

Machine Id
PH651-010-10 (S/N 2WB17757STBD)
Component
Starboard Diesel Engine
Fluid
DIESEL ENGINE OIL SAE 15W40 (68 LTR)

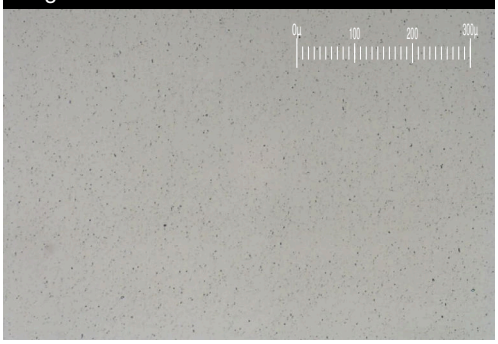
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW

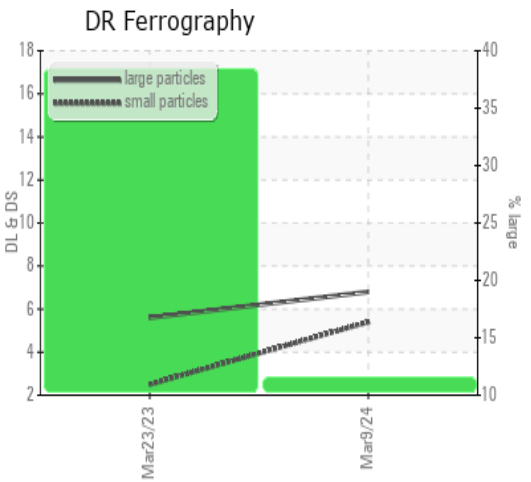


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**6.8**	5.6	---
Small Particles		DR-Ferr*		**5.4**	2.5	---
Total Particles		DR-Ferr*	>---	**12.2**	8.1	---
Large Particles Percentage	%	DR-Ferr*		**11.5**	38.3	---
Severity Index		DR-Ferr*		**10**	17	---

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		**2**	2	
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		**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**		
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*			1	
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	
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**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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