MAR III

WEAR CHECK

OIL ANALYSIS REPORT

WEAR	MARGINAL
CONTAMINANTS	SEVERE
OIL CONDITION	NORMAL

Machine Id
EGR-23154 CPP
Component
Starboard Hydraulic System
Fluid
SHELL TELLUS S2 VX 46 (1000 LTR)

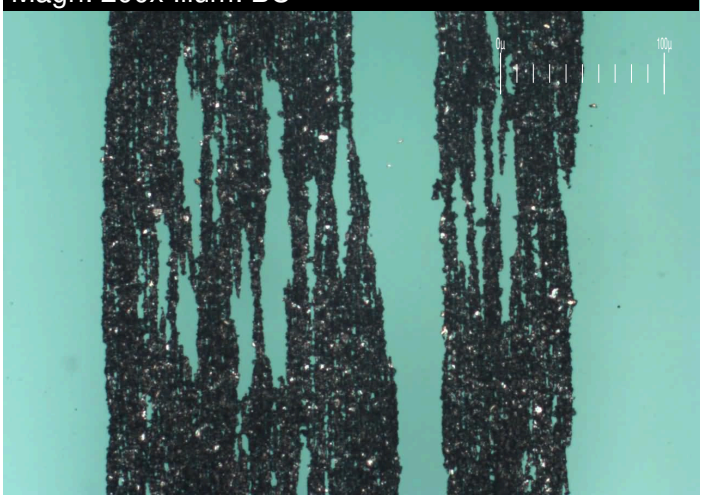
RECOMMENDATION

Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Resample in 30-45 days to monitor this situation. No other corrective action is recommended at this time.

WEAR

Wear particle analysis indicates that the ferrous rubbing particles are marginal. All other component wear rates are normal.

Magn: 200x Illum: BC



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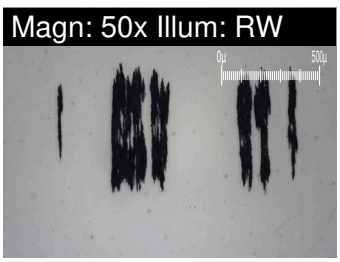

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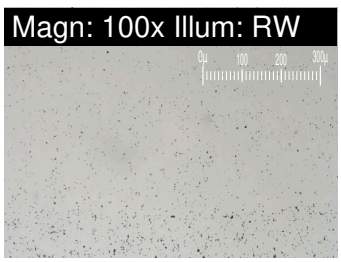


Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0574862	WC0494654	WC0494645
Sample Date		Client Info		30 Aug 2023	21 Sep 2022	31 Jul 2022
Machine Age	hrs	Client Info		71798	70800	70589
Oil Age	hrs	Client Info		997	7909	7698
Filter Age	hrs	Client Info		997	0	0
Oil Changed		Client Info		Not Changd	Changed	Not Changd
Filter Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				SEVERE	ABNORMAL	SEVERE
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>20	4	4	4
Chromium	ppm	ASTM D5185(m)	>10	0	0	0
Nickel	ppm	ASTM D5185(m)	>10	<1	<1	<1
Titanium	ppm	ASTM D5185(m)		0	0	0
Silver	ppm	ASTM D5185(m)		0	0	0
Aluminum	ppm	ASTM D5185(m)	>10	<1	2	2
Lead	ppm	ASTM D5185(m)	>20	<1	<1	1
Copper	ppm	ASTM D5185(m)	>20	4	24	25
Tin	ppm	ASTM D5185(m)	>10	0	<1	0
Vanadium	ppm	ASTM D5185(m)		0	0	0
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Large Particles		DR-Ferr*		49.8	27.9	48.0
Small Particles		DR-Ferr*		28.7	13.9	28.2
Total Particles		DR-Ferr*	>---	78.5	41.8	76.2
Large Particles Percentage	%	DR-Ferr*		26.9	33.5	26
Severity Index		DR-Ferr*		1051	391	950
Ferrous Rubbing	Scale 0-10	ASTM D7684*		5	3	3
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		2	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	2	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*				

CONTAMINANTS

There is a high amount of silt (particulates < 14 microns in size) present in the oil.

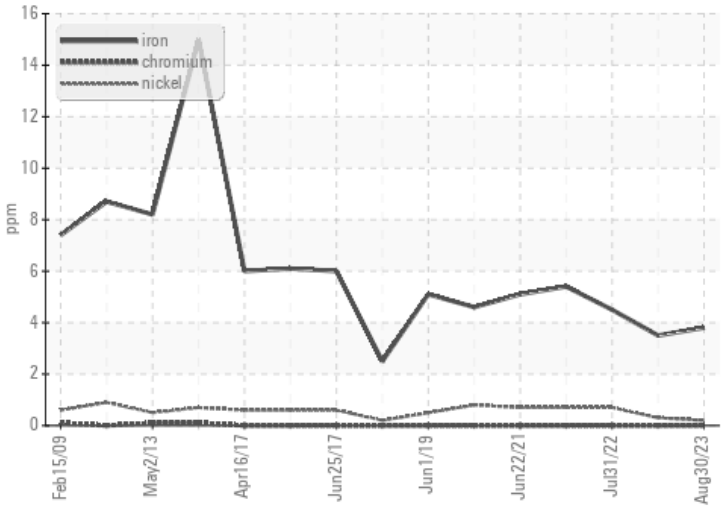
Silicon	ppm	ASTM D5185(m)	>15	**3**	1	1
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	0
Water		WC Method	>0.05	**NEG**	NEG	NEG
Particles >4µm		ASTM D7647	>5000	▲ **96449**	▲ 32858	▲ 65408
Particles >6µm		ASTM D7647	>1300	▲ **12457**	774	● 2071
Particles >14µm		ASTM D7647	>160	**74**	8	5
Particles >21µm		ASTM D7647	>40	**11**	3	1
Particles >38µm		ASTM D7647	>10	**1**	1	0
Particles >71µm		ASTM D7647	>3	**0**	1	0
Oil Cleanliness		ISO 4406 (c)	>19/17/14	▲ **24/21/13**	▲ 22/17/10	▲ 23/18/10
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*	>0.05	**NEG**	NEG	NEG
Carbonaceous Material	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*		**2**	2	2

OIL CONDITION

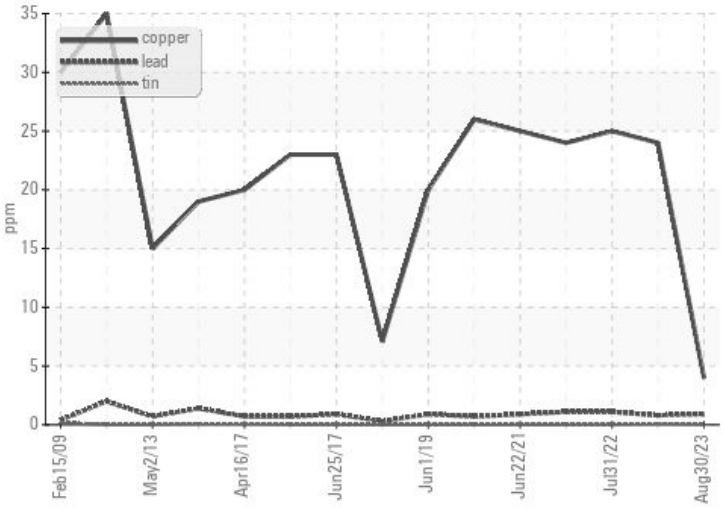
The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

Sodium	ppm	ASTM D5185(m)		**2**	4	4
Boron	ppm	ASTM D5185(m)		**<1**	<1	<1
Barium	ppm	ASTM D5185(m)		**<1**	<1	<1
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**<1**	2	2
Magnesium	ppm	ASTM D5185(m)		**73**	8	7
Calcium	ppm	ASTM D5185(m)		**18**	41	42
Phosphorus	ppm	ASTM D5185(m)		**310**	294	285
Zinc	ppm	ASTM D5185(m)		**359**	324	330
Sulfur	ppm	ASTM D5185(m)		**769**	1050	1085
Acid Number (AN)	mg KOH/g	ASTM D974*		**0.33**	0.28	0.29
Visc @ 40°C	cSt	ASTM D7279(m)	46	**46.0**	44.9	45.0
Lubricant Degradation	Scale 0-10	ASTM D7684*				

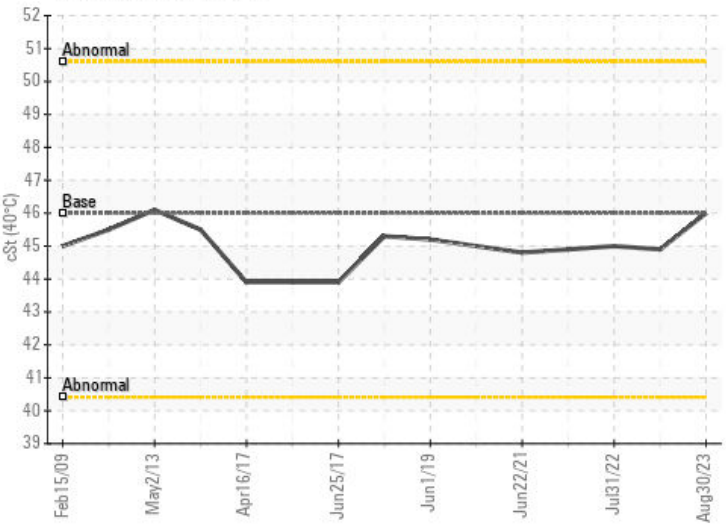
Ferrous Alloys



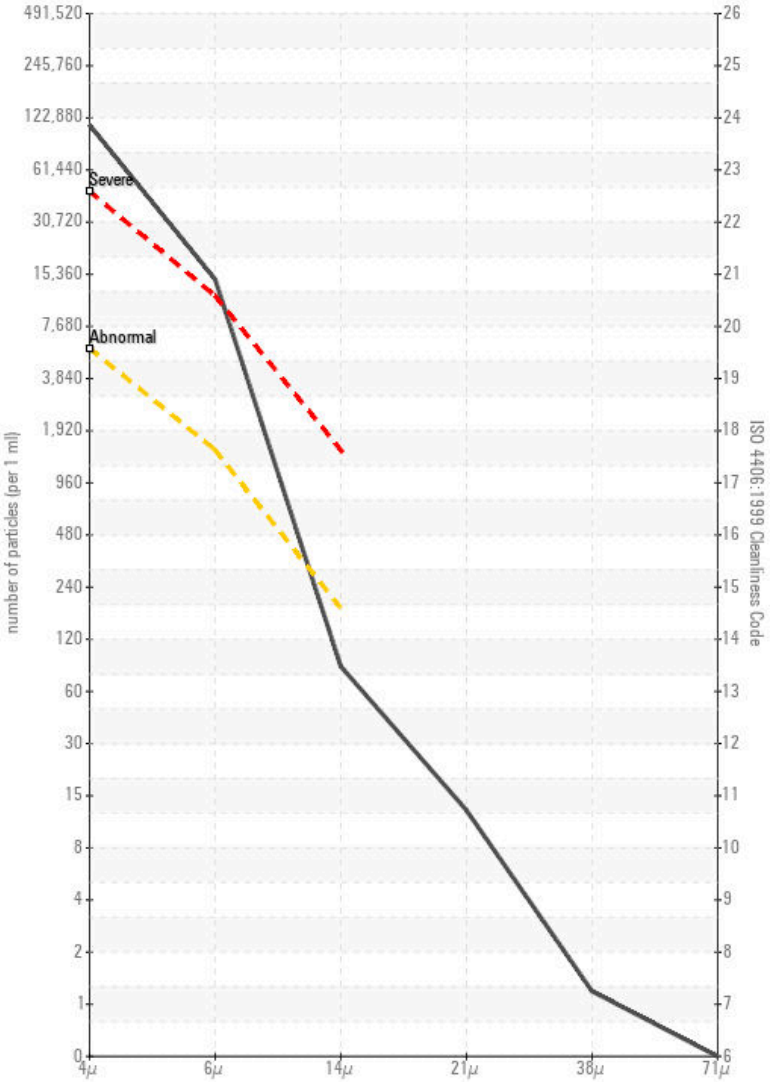
Non-ferrous Metals



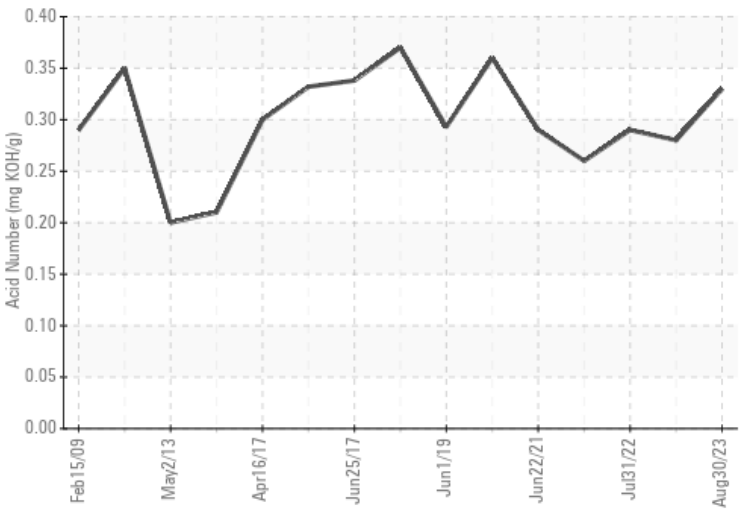
Viscosity @ 40°C



Particle Count



Acid Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0574862
Lab Number : 02581824
Unique Number : 5642889
Test Package : MAR 3

Received : 12 Sep 2023
Tested : 14 Sep 2023
Diagnosed : 15 Sep 2023 - Kevin Marson

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.

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