

PROBLEM SUMMARY

Area **PROPULSION EQUIPMENT** Machine Id SIMPLEX STERN TUBE/ PROPELLER HUB (CAL012) (S/N CALVERT13) Component

Sterntube

VICKERS HYDROX BIO 100 (400 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation.

PROBLEMATIC TEST RESULTS								
Sample Status				SEVERE	ABNORMAL	ABNORMAL		
Titanium	ppm	ASTM D5185(m)	>8	<u> </u>	1 1	<u> </u>		
Particles >4µm		ASTM D7647	>10000	113301	▲ 75724			
Particles >6µm		ASTM D7647	>2500	52577	🔺 14188			
Particles >14µm		ASTM D7647	>160	🔺 569	93			
Particles >21µm		ASTM D7647	>40	<u> </u>	45			
Particles >71µm		ASTM D7647	>3	1 1	4			
Oil Cleanliness		ISO 4406 (c)	>20/18/14	4 24/23/16	🔺 23/21/15			

Customer Id: MVCALVERT Sample No.: PC0080229 Lab Number: 02638001 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 Kevin.Marson@wearcheck.com

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 gloria.gonzalez@wearcheck.com



RECONNINENDER	DACTIONS			
Action	Status	Date	Done By	Description
Change Filter			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
Resample			?	Resample in 30-45 days to monitor this situation.
Check Breathers			?	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.
Check Dirt Access			?	We advise that you check all areas where contaminants can enter the system.
Filter Fluid			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.

HISTORICAL DIAGNOSIS

07 Nov 2023 Diag: Kevin Marson

WEAR

We recommend you service the filters on this component. We recommend an early resample to monitor this condition. Titanium ppm levels are abnormal. There is a moderate amount of silt (particulates < 14 microns in size) present in the oil. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.





09 Aug 2023 Diag: Kevin Marson

We recommend an early resample to monitor this condition. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MOB 3 test kits, this testkit includes Particle Count to determine the ISO cleanliness of the fluid. this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid. Iron and titanium ppm levels are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. There is no indication of any contamination in the oil. The condition of the oil is acceptable for the time in service.



03 May 2023 Diag: Kevin Marson

We advise that you check for the source of water entry. 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 advise that you use offline filtration with water adsorbent filters to attempt to remove the water from this oil. We recommend an early resample to monitor this condition. Iron and titanium ppm levels are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. There is a moderate concentration of water present in the oil. The oil viscosity is lower than typical, possibly indicating the addition of lighter grade oil. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.





OIL ANALYSIS REPORT

Area **PROPULSION EQUIPMENT** Machine Id SIMPLEX STERN TUBE/ PROPELLER HUB (CAL012) (S/N CALVERT13) Component

Sterntube

Fluid VICKERS HYDROX BIO 100 (400 LTR)

DIAGNOSIS

A Recommendation

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation.

🔺 Wear

Titanium ppm levels are abnormal.

Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the oil.

Fluid Condition

The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC0080229	PC0076335	PC0011627
Sample Date		Client Info		17 May 2024	07 Nov 2023	09 Aug 2023
Machine Age	hrs	Client Info		24544	21847	20530
Oil Age	hrs	Client Info		21847	21847	2802
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				SEVERE	ABNORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Water		WC Method	>0.1	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>15	11	14	1 7
Chromium	ppm	ASTM D5185(m)	>2	0	0	<1
Nickel	ppm	ASTM D5185(m)	>2	0	<1	<1
Titanium	ppm	ASTM D5185(m)	>8	<u> </u>	1 1	<u> </u>
Silver	ppm	ASTM D5185(m)		0	0	<1
Aluminum	ppm	ASTM D5185(m)	>4	<1	1	<1
Lead	ppm	ASTM D5185(m)	>15	5	5	6
Copper	ppm	ASTM D5185(m)	>25	4	5	6
Tin	ppm	ASTM D5185(m)	>10	1	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	method ASTM D5185(m)	limit/base	current 2	history1 2	history2 3
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0	history1 2 0	history2 3 <1
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0	history1 2 0 0	history2 3 <1 0
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 0	history1 2 0 0 0 0	history2 3 <1 0 0
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 0 0 4	history1 2 0 0 0 4	history2 3 <1 0 0 4
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 0 4 4 4	history1 2 0 0 0 4 5	history2 3 <1 0 0 4 7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 0 4 4 4 642	history1 2 0 0 0 4 5 662	history2 3 <1 0 0 4 7 666
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 4 642 5	history1 2 0 0 0 4 5 662 5	history2 3 <1 0 0 4 7 666 7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 0 0 4 642 5 1354	history1 2 0 0 0 4 5 662 5 1601	history2 3 <1 0 0 4 7 666 7 1497
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 0 4 642 5 1354 <1	history1 2 0 0 0 4 5 662 5 1601 <1	history2 3 <1 0 0 4 7 666 7 1497 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 0 4 642 5 1354 <1 current	history1 2 0 0 0 4 5 662 5 1601 <1 history1	history2 3 <1 0 0 4 7 666 7 1497 <1 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 4 642 5 1354 <1 current 3	history1 2 0 0 0 4 5 662 5 1601 <1 history1 4	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 0 4 642 5 1354 <1 current 3 13	history1 2 0 0 0 4 5 662 5 1601 <1 history1 4 16	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 0 4 642 5 1354 <1 2 3 13 <1	history1 2 0 0 0 4 5 662 5 1601 4 16 2	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base	current 2 0 0 0 4 642 5 1354 <1 3 13 <1 current 3 13 <1	history1 2 0 0 0 4 5 662 5 1601 <1 history1 4 16 2 history1	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANIL Particles >4um	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base >25 >20 limit/base >10000	current 2 0 0 4 642 5 1354 <1 3 13 <1 current 3 13 <1	history1 2 0 0 0 4 5 1601 <1 history1 4 16 2 history1	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1 -1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	method ASTM D5185(m)	limit/base >25 >20 limit/base >10000 >2500	current 2 0 0 4 642 5 1354 <1 Current 3 13 <1 current 13 <1 £ 13301 52577	history1 2 0 0 0 4 5 662 5 1601 4 16 2 history1 4 16 2 history1 ▲ 14	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m)	limit/base >25 >20 limit/base >20 limit/base >10000 >2500 >160	current 2 0 0 4 642 5 1354 <1 3 13 <1 current 3 13 <1 current 13301 52577 569	history1 2 0 0 0 4 5 662 5 1601 2 history1 4 16 2 history1 ▲ 14188 193	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >4µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D7647 ASTM D7647	limit/base >25 >20 limit/base >20 limit/base >10000 >2500 >160 >40	current 2 0 0 4 642 5 1354 <1 3 13 <1 13 <1 13301 52577 569 107	history1 2 0 0 4 5 662 5 1601 <1 4 16 2 history1 4 16 2 history1 ▲ 14188 193 45	history2 3 <1 0 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >4µm Particles >14µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	limit/base >25 >20 limit/base >20 2500 >10000 >2500 >160 >40 >10	current 2 0 0 4 642 5 1354 <1 3 13 <1 13 <1 3 13 <1 5 13301 52577 569 107 19	history1 2 0 0 4 5 662 5 1601 <1 4 16 2 history1 4 16 2 history1 1 193 45 10	history2 3 <1 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >4µm Particles >14µm Particles >38µm Particles >71µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	limit/base >25 >20 limit/base >20 limit/base >20 >10000 >2500 >160 >40 >10 >10 >3	current 2 0 0 0 4 642 5 1354 <1 current 3 13 <1 current 3 13 <1 current 13301 525777 569 107 19 11	history1 2 0 0 4 5 662 5 1601 <1 4 16 2 history1 4 16 2 history1 4 16 2 history1 4 16 2 183 193 45 10 4	history2 3 <1 0 4 7 666 7 1497 <1 history2 4 14 <1 history2 4 14 <1 history2 <



Particle Count

Particle Trend

4. um

Viscosity @ 100°C

Viscosity @ 40°C

144

Aug9/23

Aug9/23

Aug9/23 -

Nov7/23

Nov7/23

214

491,520 122,880

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OIL ANALYSIS REPORT

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Code

384

FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		1.42	1.39	
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 PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	100	95.0	93.8	92.8
Visc @ 100°C	cSt	ASTM D7279(m)		15.9	15.6	15.3
Viscosity Index (VI)	Scale	ASTM D2270*	205	179	177	174
SAMPLE IMAG	iES	method	limit/base	current	history1	history2

Color

Bottom

May17/24

/ay17/24





: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **Ocean Choice International - MV Calvert** : 28 May 2024 Received 1315 Topsail Rd, P.O. Box 8190 Tested : 29 May 2024 St. John`s, NL Diagnosed : 29 May 2024 - Kevin Marson CA A1B 3N4 Test Package : IND 2 (Additional Tests: KV100, VI) Contact: Calvert Engine Control Room To discuss this sample report, contact Customer Service at 1-800-268-2131. calvertengine@oceanchoice.com Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Т: Validity of results and interpretation are based on the sample and information as supplied. F:

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