

OIL ANALYSIS REPORT

Area Tri State [Tri State] Oil - Starboard Genset

Component **Starboard Genset**

DIESEL ENGINE OIL SAE 15W40 (5 GAL)

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: To be changed 9-27-23)

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination 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.



b2021 Max/021 0cd/021 Feb/022 Lu/2022 Lu/2022 Lu/2023 <thLu/2023</th> <thLu/2023</th> <thLu/

Sample Rating Trend

SAMPLE INFORM	IATI <u>ON</u>	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0805320	WC0805265	WC0769275
Sample Date		Client Info		26 Sep 2023	30 Aug 2023	27 Jul 2023
Machine Age	hrs	Client Info		11854	11543	11103
Oil Age	hrs	Client Info		311	440	321
Oil Changed		Client Info		Not Changd	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	J	method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>50	4	6	3
Chromium	ppm	ASTM D5185m	>4	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>12	<1	<1	<1
Lead	ppm	ASTM D5185m	>17	<1	0	0
Copper	ppm	ASTM D5185m	>70	<1	2	2
Tin	ppm	ASTM D5185m	>15	<1	0	0
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 29	history1 26	history2 26
	ppm ppm					
Boron		ASTM D5185m	250	29	26	26
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	29 0	26 0	26 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	29 0 66	26 0 68	26 0 65
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	29 0 66 <1	26 0 68 <1	26 0 65 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	29 0 66 <1 1582	26 0 68 <1 1614	26 0 65 <1 1502
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	29 0 66 <1 1582 1167	26 0 68 <1 1614 1191	26 0 65 <1 1502 1146
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	29 0 66 <1 1582 1167 1030	26 0 68 <1 1614 1191 1012	26 0 65 <1 1502 1146 980
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	29 0 66 <1 1582 1167 1030 1312	26 0 68 <1 1614 1191 1012 1248	26 0 65 <1 1502 1146 980 1221
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	29 0 66 <1 1582 1167 1030 1312 3657	26 0 68 <1 1614 1191 1012 1248 4087	26 0 65 <1 1502 1146 980 1221 3929 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25	29 0 66 <1 1582 1167 1030 1312 3657 current	26 0 68 <1 1614 1191 1012 1248 4087 history1	26 0 65 <1 1502 1146 980 1221 3929 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	29 0 66 <1 1582 1167 1030 1312 3657 current 3	26 0 68 <1 1614 1191 1012 1248 4087 history1 4	26 0 65 <1 1502 1146 980 1221 3929 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	29 0 66 <1 1582 1167 1030 1312 3657 current 3 <1 <1 <1	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 bistory1	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20	29 0 66 <1 1582 1167 1030 1312 3657 <i>current</i> 3 <1 <1 <1 <i>current</i>	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 history1 0.7	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	29 0 66 <1 1582 1167 1030 1312 3657 current 3 <1 <1 <1	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 bistory1	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	29 0 66 <1 1582 1167 1030 1312 3657 <i>current</i> 3 <1 <1 <1 <i>current</i>	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 history1 0.7	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	29 0 66 <1 1582 1167 1030 1312 3657 <i>current</i> 3 <1 <1 <1 <i>current</i> 0.5 7.3	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 history1 0.7 8.4	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 2 history2 0.4 7.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	29 0 66 <1 1582 1167 1030 1312 3657 <i>current</i> 3 <1 <1 <1 <i>current</i> 0.5 7.3 19.0	26 0 68 <1 1614 1191 1012 1248 4087 history1 4 1 0 <u>history1</u> 0.7 8.4 19.7	26 0 65 <1 1502 1146 980 1221 3929 history2 3 2 2 2 history2 0.4 7.4 18.4



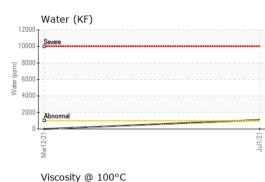
Water (ppm) 600

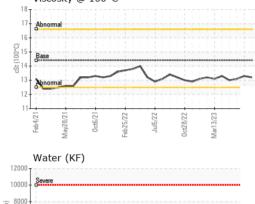
400

2000 Ab

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OIL ANALYSIS REPORT

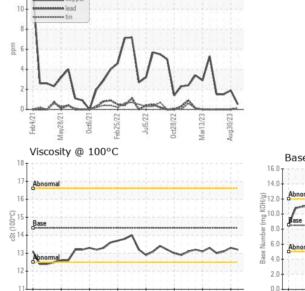


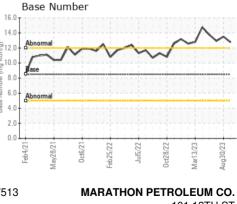


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 PROPERT	TIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.2	13.3	13.1

Feb4/21







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : WC0805320 Received : 02 Oct 2023 101 12TH ST Lab Number Diagnosed : 05966533 : 03 Oct 2023 CATLETTSBURG, KY : 10673084 Diagnostician : Sean Felton Unique Number US 41169 Test Package : IND 2 (Additional Tests: KF) Contact: CORY GUMBERT Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. cagumbert@marathonpetroleum.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (606)585-3950 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: x:

0ct28/22

Mar13/23

Aug30/23

Feb25/22

0ct6/21

Vlav/28/21

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