

OIL ANALYSIS REPORT

Martinsville [Martinsville] Oil - Starboard Genset Component

Starboard Genset

DIESEL ENGINE OIL SAE 15W40 (7 GAL)

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: Hours on oil and filter 100hours as of 10-29-23)

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.

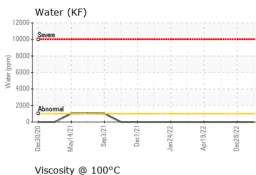


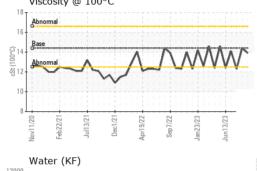
Sample Rating Trend

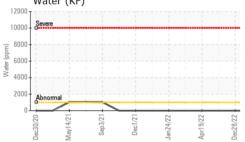
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0805443	WC0769081	WC0769127
Sample Date		Client Info		29 Oct 2023	04 Sep 2023	08 Aug 2023
Machine Age	hrs	Client Info		100	16641	16449
Oil Age	hrs	Client Info		100	0	301
Oil Changed		Client Info		Filtered	N/A	Not Changd
Sample Status				NORMAL	NORMAL	ATTENTION
CONTAMINATIO	N	method	limit/base	current	history1	history2
Fuel	N	WC Method	>4.0		<1.0	<1.0
			>4.0	<1.0 NEG		
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>50	3	2	4
Chromium	ppm	ASTM D5185m	>4	<1	0	<1
Nickel	ppm	ASTM D5185m	>2	<1	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>12	2	<1	2
Lead	ppm	ASTM D5185m	>17	<1	<1	0
Copper	ppm	ASTM D5185m	>70	2	0	0
Tin	ppm	ASTM D5185m	>15	0	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 32	history1 46	history2 128
	ppm ppm					
Boron		ASTM D5185m	250	32	46	128
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	32 2	46 0	128 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	32 2 53	46 0 64	128 0 84
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	32 2 53 0	46 0 64 <1	128 0 84 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	32 2 53 0 1117	46 0 64 <1 1464	128 0 84 <1 1174
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	32 2 53 0 1117 1083	46 0 64 <1 1464 1242	128 0 84 <1 1174 1342
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	250 10 100 450 3000 1150	32 2 53 0 1117 1083 900	46 0 64 <1 1464 1242 1014	128 0 84 <1 1174 1342 891
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm 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 1350	32 2 53 0 1117 1083 900 1077	46 0 64 <1 1464 1242 1014 1288	128 0 84 <1 1174 1342 891 1068
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	32 2 53 0 1117 1083 900 1077 3180	46 0 64 <1 1464 1242 1014 1288 4128	128 0 84 <1 1174 1342 891 1068 3542
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	32 2 53 0 1117 1083 900 1077 3180 current	46 0 64 <1 1464 1242 1014 1288 4128 history1	128 0 84 <1 1174 1342 891 1068 3542 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 ASTM D5185m method	250 10 100 450 3000 1150 1350 4250 kimit/base >25 >158	32 2 53 0 11117 1083 900 1077 3180 current 5	46 0 64 <1 1464 1242 1014 1288 4128 history1 5	128 0 84 <1 1174 1342 891 1068 3542 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	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 ASTM D5185m	250 10 100 450 3000 1150 1350 4250 kimit/base >25 >158	32 2 53 0 11117 1083 900 1077 3180 current 5 2	46 0 64 <1 1464 1242 1014 1288 4128 history1 5 <	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0
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	32 2 53 0 1117 1083 900 1077 3180 current 5 2 3	46 0 64 <1 1464 1242 1014 1288 4128 history1 5 < <1 3	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 Iimit/base >25 >158 >20	32 2 53 0 11117 1083 900 1077 3180 current 5 2 3 3 current	46 0 64 1464 1242 1014 1288 4128 history1 5 < <1 3 history1	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 Iimit/base >25 >158 >20	32 2 53 0 1117 1083 900 1077 3180 current 5 2 3 3 current 0	46 0 64 <1 1464 1242 1014 1288 4128 history1 5 <1 3 history1 0.1	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 history2 0.1
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	32 2 53 0 1117 1083 900 1077 3180 current 5 2 3 3 current 0 5.1	46 0 64 <1 1464 1242 1014 1288 4128 history1 5 <1 3 history1 0.1 5.5	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 history2 0.1 6.7
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 imit/base >25 >158 >20 imit/base >20 >20	32 2 53 0 1117 1083 900 1077 3180 current 5 2 3 current 0 5.1 18.8	46 0 64 1464 1242 1014 1288 4128 history1 5 <1 3 history1 0.1 5.5 18.5	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 history2 0.1 6.7 19.9
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 D7844 *ASTM D7624 *ASTM D7415	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >20 >30 imit/base	32 2 53 0 11117 1083 900 1077 3180 current 5 2 3 3 current 0 5.1 18.8	46 0 64 1464 1242 1014 1288 4128 history1 5 <1 3 history1 0.1 5.5 18.5	128 0 84 <1 1174 1342 891 1068 3542 history2 3 0 0 0 history2 0.1 6.7 19.9 history2



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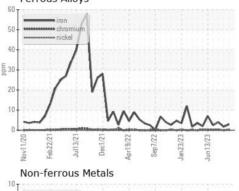


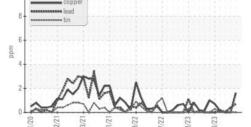


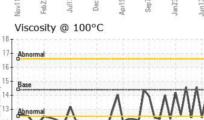


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.9	14.4	12.3
GRAPHS						

Ferrous Alloys







Sep7/22

an 23/23

Jun 13/23

: 07 Nov 2023

pr19/22

Received

Diagnosed

cSt (100°C)

10

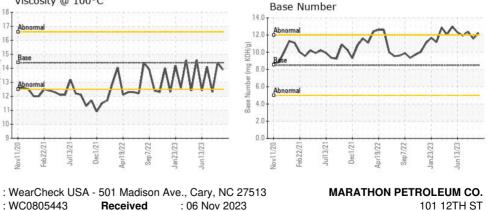
Laboratory

Sample No.

Lab Number

Unique Number

Nov11/20



101 12TH ST CATLETTSBURG, KY US 41169 Contact: CORY GUMBERT cagumbert@marathonpetroleum.com T: (606)585-3950 F: x:



Diagnostician : Sean Felton Test Package : IND 2 (Additional Tests: KF) Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Jul13/21

Dec1/71

Feb22/21

: WC0805443

: 05999211

: 10727571