

OIL ANALYSIS REPORT

Area Kentucky [Kentucky] Oil - Starboard Genset

Starboard Genset

Fluid DIESEL ENGINE OIL SAE 15W40 (7 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

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.

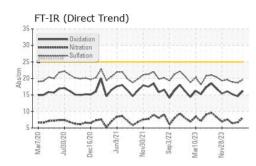


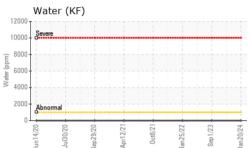
Sample Rating Trend

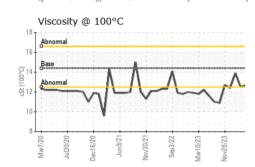
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0874599	WC0845801	WC0874820
Sample Date		Client Info		09 Jun 2024	25 Apr 2024	16 Mar 2024
Machine Age	hrs	Client Info		8620	8272	7931
Oil Age	hrs	Client Info		420	76	0
Oil Changed		Client Info		Changed	N/A	Oil Added
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	N	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	5	2	3
Chromium	ppm	ASTM D5185m	>4	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	<1	<1
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>5	0	<1	<1
Aluminum	ppm	ASTM D5185m	>12	2	1	2
Lead	ppm	ASTM D5185m	>17	<1	<1	<1
Copper	ppm		>70	2	2	2
Tin	ppm		>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		<1	<1	<1
ADDITIVES		ام م مالا م معر	limit/booo		1 C	history2
		method	limit/base	current	history1	TIIStoryz
Boron	ppm	ASTM D5185m	250	9	10	11
	ppm ppm					
Boron		ASTM D5185m	250	9	10	11
Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m	250 10	9 0	10 <1	11 0
Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	9 0 65	10 <1 61	11 0 57
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	9 0 65 <1	10 <1 61 <1	11 0 57 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	9 0 65 <1 1513	10 <1 61 <1 1389	11 0 57 <1 1302
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	9 0 65 <1 1513 1252	10 <1 61 <1 1389 1206	11 0 57 <1 1302 1149
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	9 0 65 <1 1513 1252 1089	10 <1 61 <1 1389 1206 1094	11 0 57 <1 1302 1149 1046
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	9 0 65 <1 1513 1252 1089 1360	10 <1 61 <1 1389 1206 1094 1276	11 0 57 <1 1302 1149 1046 1210
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	250 10 100 450 3000 1150 1350 4250	9 0 65 <1 1513 1252 1089 1360 3413	10 <1 61 <1 1389 1206 1094 1276 3471	11 0 57 <1 1302 1149 1046 1210 3459
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	9 0 65 <1 1513 1252 1089 1360 3413 current	10 <1 61 <1 1389 1206 1094 1276 3471 history1	11 0 57 <1 1302 1149 1046 1210 3459 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	9 0 65 <1 1513 1252 1089 1360 3413 current 3	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5	11 0 57 <1 1302 1149 1046 1210 3459 history2 5
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	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	9 0 65 <1 1513 1252 1089 1360 3413 <u>current</u> 3 3	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5 1	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	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	9 0 65 <1 1513 1252 1089 1360 3413 Current 3 3 1	10 <1 61 <31 1389 1206 1094 1276 3471 history1 5 1 2	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	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 >0.1	9 0 65 <1 1513 1252 1089 1360 3413 current 3 3 3 1 NEG	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5 1 2 NEG	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water 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 >0.1	9 0 65 <1 1513 1252 1089 1360 3413 <i>current</i> 3 3 1 NEG	10 <1 61 389 1206 1094 1276 3471 history1 5 1 2 NEG history1	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot %	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 >0.1	9 0 65 <1 1513 1252 1089 1360 3413 <i>current</i> 3 3 1 NEG <i>current</i> 0.1	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5 1 2 NEG history1 0.1	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG history2 0.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 ASTM D6304 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 20 >25 >158 >20 >0.1 imit/base >20	9 0 65 <1 1513 1252 1089 1360 3413 <i>current</i> 3 3 1 NEG 0.1 8.1	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5 1 2 NEG NEG history1 0.1 6.7	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG NEG history2 0.1 6.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 •ASTM D7844 *ASTM D7624 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 >0.1 imit/base >20 >0.1	9 0 65 <1 1513 1252 1089 1360 3413 Current 3 3 3 1 NEG 0.1 8.1 19.6	10 <1 61 <1 1389 1206 1094 1276 3471 history1 5 1 2 NEG history1 0.1 6.7 18.7	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG NEG history2 0.1 6.4 18.9 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Vater 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 >0.1 Imit/base >20 >0.1	9 0 65 <1 1513 1252 1089 1360 3413 <u>current</u> 3 3 1 NEG <u>current</u> 0.1 8.1 19.6	10 <1 61 389 1206 1094 1276 3471 history1 5 1 2 NEG history1 0.1 6.7 18.7	11 0 57 <1 1302 1149 1046 1210 3459 history2 5 3 2 NEG history2 0.1 6.4 18.9

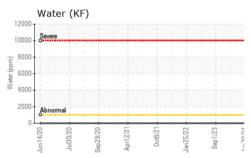


OIL ANALYSIS REPORT



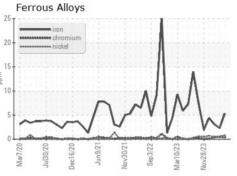


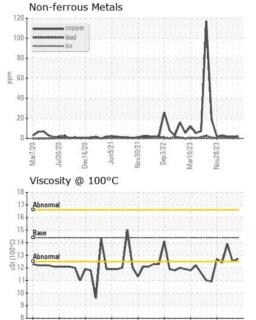


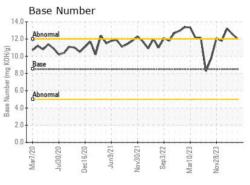


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	MODER
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	12.7	12.5	13.9

GRAPHS







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. Sample No. : WC0874599 Received : 14 Jun 2024 101 12TH ST Lab Number : 06210380 Tested : 18 Jun 2024 CATLETTSBURG, KY Unique Number : 11083244 Diagnosed : 18 Jun 2024 - Don Baldridge US 41169 Test Package : IND 2 (Additional Tests: KF) Contact: CORY GUMBERT Certificate 12367 cagumbert@marathonpetroleum.com To discuss this sample report, contact Customer Service at 1-800-237-1369. T: (606)585-3950 * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. F: x:

PD3/77

far10/23

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Dec16/20 10/21

Mar7/20

Report Id: MARCAT [WUSCAR] 06210380 (Generated: 06/22/2024 19:35:59) Rev: 1

Submitted By: M/V KENTUCKY

Page 2 of 2