

OIL ANALYSIS REPORT



Sample Rating Trend





Map Runner [Map Runner] Oil - Starboard Main Engine Component Starboard Main Engine

DIESEL ENGINE OIL SAE 15W40 (37 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

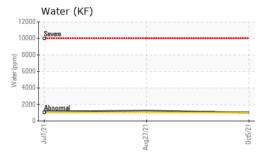
Fluid Condition

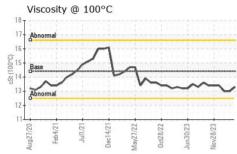
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

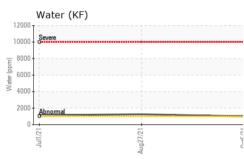
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0859926	WC0859836	WC0845879
Sample Date		Client Info		20 Mar 2024	26 Feb 2024	23 Jan 2024
Machine Age	hrs	Client Info		6538	6007	0
Oil Age	hrs	Client Info		283	641	0
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	V	method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
•		and the section of	12 21 /1		la faction and	le la la ma
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>75	7	6	5
Chromium	ppm	ASTM D5185m	>8	<1	0	<1
Nickel	ppm	ASTM D5185m	>2	<1	0	<1
Titanium	ppm	ASTM D5185m	>3	<1	0	<1
Silver	ppm	ASTM D5185m	>2	<1	0	<1
Aluminum	ppm	ASTM D5185m	>15	2	0	2
Lead	ppm	ASTM D5185m	>18	<1	0	3
Copper	ppm	ASTM D5185m	>80	2	2	4
Tin	ppm	ASTM D5185m	>14	<1	0	1
Vanadium	ppm	ASTM D5185m		<1	0	<1
Cadmium	ppm	ASTM D5185m		<1	0	0
						la la La ma O
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	250	current 7	history1 6	nistory2 11
	ppm				,	
Boron	• • •	ASTM D5185m	250	7	6	11
Boron Barium Molybdenum Manganese	ppm	ASTM D5185m ASTM D5185m	250 10 100	7 0	6	11 0 65 2
Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	7 0 66	6 0 58	11 0 65
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	7 0 66 <1 1439 1188	6 0 58 0 1463 1149	11 0 65 2
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	7 0 66 <1 1439	6 0 58 0 1463	11 0 65 2 1391
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	7 0 66 <1 1439 1188 1126 1303	6 0 58 0 1463 1149	11 0 65 2 1391 1072 1047
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	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	7 0 66 <1 1439 1188 1126	6 0 58 0 1463 1149 967	11 0 65 2 1391 1072 1047
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 ASTM D5185m	250 10 100 450 3000 1150 1350	7 0 66 <1 1439 1188 1126 1303	6 0 58 0 1463 1149 967 1248	11 0 65 2 1391 1072 1047
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 limit/base	7 0 66 <1 1439 1188 1126 1303 3697	6 0 58 0 1463 1149 967 1248 3798	11 0 65 2 1391 1072 1047 1265 3283
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	7 0 66 <1 1439 1188 1126 1303 3697	6 0 58 0 1463 1149 967 1248 3798	11 0 65 2 1391 1072 1047 1265 3283 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	7 0 66 <1 1439 1188 1126 1303 3697 current	6 0 58 0 1463 1149 967 1248 3798 history1	11 0 65 2 1391 1072 1047 1265 3283 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	7 0 66 <1 1439 1188 1126 1303 3697 current 4	6 0 58 0 1463 1149 967 1248 3798 history1	11 0 65 2 1391 1072 1047 1265 3283 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1	6 0 58 0 1463 1149 967 1248 3798 history1 2 0	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1 2 NEG	6 0 58 0 1463 1149 967 1248 3798 history1 2 0 0	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4 3 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 ppm	ASTM D5185m ASTM D6304	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1 2 NEG current	6 0 58 0 1463 1149 967 1248 3798 history1 2 0 0 NEG	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4 3 NEG
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 D6304	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1 2 NEG current 0.2	6 0 58 0 1463 1149 967 1248 3798 history1 2 0 0 NEG	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4 3 NEG history2
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 method *ASTM D7844 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1 2 NEG current 0.2 7.3	6 0 58 0 1463 1149 967 1248 3798 history1 2 0 NEG history1 0.2 8.0	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4 3 NEG history2 0.1 7.3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D76145	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	7 0 66 <1 1439 1188 1126 1303 3697 current 4 <1 2 NEG current 0.2 7.3 20.0	6 0 58 0 1463 1149 967 1248 3798 history1 2 0 NEG history1 0.2 8.0 19.5	11 0 65 2 1391 1072 1047 1265 3283 history2 4 4 3 NEG history2 0.1 7.3 19.6



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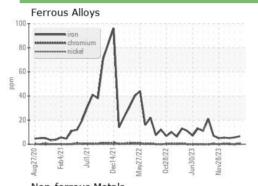


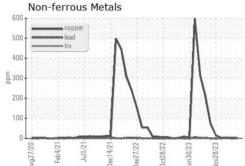


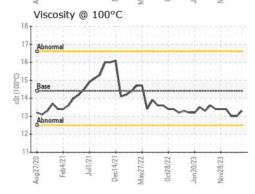
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	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

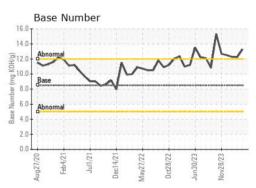
FLUID PROPERTIES		method			history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.3	13.0	13.0

GRAPHS













Laboratory Sample No. Lab Number : 06130834

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0859926

Unique Number: 10950299

Received **Tested**

Diagnosed

: 27 Mar 2024 : 01 Apr 2024 : 01 Apr 2024 - Jonathan Hester MARATHON PETROLEUM CO.

101 12TH ST CATLETTSBURG, KY

US 41169 Contact: CORY GUMBERT

Test Package : IND 2 (Additional Tests: KF) To discuss this sample report, contact Customer Service at 1-800-237-1369.

cagumbert@marathonpetroleum.com T: (606)585-3950

Submitted By: M/V MAP RUNNER

* - 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)

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