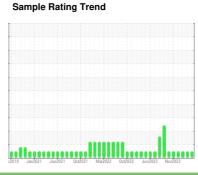


OIL ANALYSIS REPORT

Mt. Vernon [Mt. Vernon] Oil - Starboard Main Engine

Starboard Main Engine

DIESEL ENGINE OIL SAE 15W40 (250 GAL)





Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment:

Top Up Amount: 20)

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

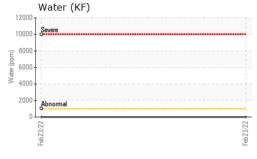
Fluid Condition

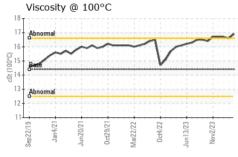
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

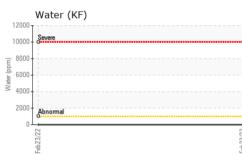
	4ATION	ام مالم مما	line it /le e e e		la i a ta mud	la i a t a un . O
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0845783	WC0845789	WC0735814
Sample Date		Client Info		16 Mar 2024	15 Feb 2024	30 Dec 2023
Machine Age	hrs	Client Info		11383	10665	9796
Oil Age	hrs	Client Info		11383	10665	9796
Oil Changed		Client Info		Oil Added	Not Changd	Not Changd
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		mathad	limit/base	ourront.	historyd	hiotom/2
		method		current	history1	history2
Iron	ppm	ASTM D5185m	>75	37	35	34
Chromium	ppm	ASTM D5185m		2	2	1
Nickel	ppm	ASTM D5185m	>2	1	1	<1
Titanium	ppm	ASTM D5185m		<1	<1	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	5	5	4
Lead	ppm	ASTM D5185m	>18	49	47	50
Copper	ppm	ASTM D5185m	>80	74	69	69
Tin	ppm	ASTM D5185m	>14	17	17	18
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method				history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 4	history1 4	history2 4
	ppm					
Boron Barium		ASTM D5185m	250	4	4	4
Boron	ppm	ASTM D5185m ASTM D5185m	250 10	4 0	4 0	4
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	4 0 2	4 0 1	4 0 1
Boron Barium Molybdenum	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	4 0 2 0	4 0 1 <1	4 0 1
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	4 0 2 0 34	4 0 1 <1 22 3307	4 0 1 0 37 3258
Boron Barium Molybdenum Manganese Magnesium	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	4 0 2 0 34 3363 31	4 0 1 <1 22 3307 13	4 0 1 0 37 3258 23
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	4 0 2 0 34 3363	4 0 1 <1 22 3307	4 0 1 0 37 3258
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	4 0 2 0 34 3363 31 26	4 0 1 <1 22 3307 13	4 0 1 0 37 3258 23 32
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	4 0 2 0 34 3363 31 26 4751	4 0 1 <1 22 3307 13 10 4508	4 0 1 0 37 3258 23 32 4217
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 >20	4 0 2 0 34 3363 31 26 4751	4 0 1 <1 22 3307 13 10 4508 history1	4 0 1 0 37 3258 23 32 4217 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	4 0 2 0 34 3363 31 26 4751 current 6	4 0 1 <1 22 3307 13 10 4508	4 0 1 0 37 3258 23 32 4217 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 >20 >158 >20	4 0 2 0 34 3363 31 26 4751 current 6 14	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1
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	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	4 0 2 0 34 3363 31 26 4751 current 6	4 0 1 <1 22 3307 13 10 4508 history1 7	4 0 1 0 37 3258 23 32 4217 history2
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	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 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 method *ASTM D7844	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG current 0.5	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG history1 0.5	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 NEG history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration	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	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG current 0.5 14.5	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG history1 0.5 13.9	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 NEG history2 0.5 14.1
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	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG current 0.5	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG history1 0.5	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 NEG history2 0.5 14.1 23.0
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	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG current 0.5 14.5	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG history1 0.5 13.9	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 NEG history2 0.5 14.1
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	4 0 2 0 34 3363 31 26 4751 current 6 14 2 NEG current 0.5 14.5 22.8	4 0 1 <1 22 3307 13 10 4508 history1 7 15 0 NEG history1 0.5 13.9 22.7	4 0 1 0 37 3258 23 32 4217 history2 10 16 <1 NEG history2 0.5 14.1 23.0



OIL ANALYSIS REPORT

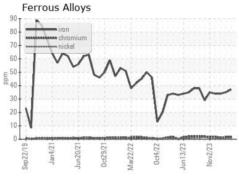


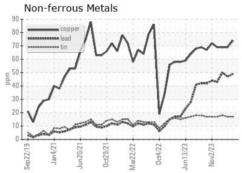


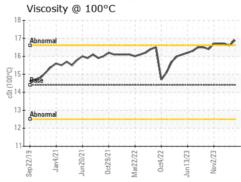


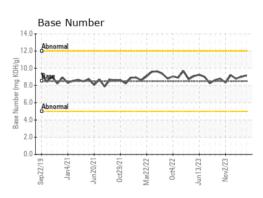
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 PROPERTIES		method				history2
Visc @ 100°C	cSt	ASTM D445	14.4	16.9	16.6	16.7













Laboratory Sample No. Unique Number : 10950277

Lab Number : 06130812

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0845783

Test Package : IND 2 (Additional Tests: KF)

Received : 27 Mar 2024 **Tested** Diagnosed

: 01 Apr 2024 : 01 Apr 2024 - Jonathan Hester MARATHON PETROLEUM CO. 101 12TH ST

CATLETTSBURG, KY US 41169

T: (606)585-3950

Contact: CORY GUMBERT cagumbert@marathonpetroleum.com

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)

F: x: