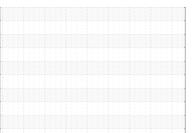


OIL ANALYSIS REPORT

Sample Rating Trend







Canton Machine Id [Canton] Oil - Starboard Main Engine Component

Starboard Main Engine

DIESEL ENGINE OIL SAE 15W40 (150 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

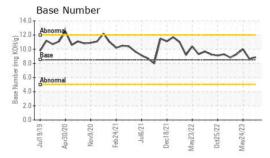
Fluid Condition

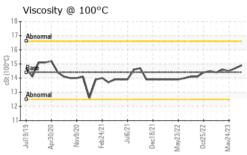
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0769239	WC0735837	WC0735387
Sample Date		Client Info		20 Jul 2023	22 Jun 2023	24 May 2023
Machine Age	hrs	Client Info		0	11197	10781
Oil Age	hrs	Client Info		11706	11197	10783
Oil Changed		Client Info		Filtered	N/A	Filtered
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	V	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	>75	33	18	26
Chromium	ppm	ASTM D5185m	>8	<1	<1	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>3	<1	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	<1	<1	5
Lead	ppm	ASTM D5185m	>18	9	0	8
Copper	ppm	ASTM D5185m	>80	4	2	3
Tin	ppm	ASTM D5185m	>14	1	<1	0
Vanadium	ppm	ASTM D5185m		0	0	0
O - dood one		ACTM DE10E		•		0
Cadmium	ppm	ASTM D5185m		0	0	U
ADDITIVES	ppm	method	limit/base	current	0 history1	history2
	ppm		limit/base			
ADDITIVES		method		current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	250	current	history1	history2
ADDITIVES Boron Barium	ppm	method ASTM D5185m ASTM D5185m	250 10	current 111 0	history1 144 0	history2 118
ADDITIVES Boron Barium Molybdenum	ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	250 10	current 111 0 99	history1 144 0 99	history2 118 0 99
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	current 1111 0 99 <1	history1 144 0 99 <1	history2 118 0 99
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	current 1111 0 99 <1 1162	history1 144 0 99 <1 1088	history2 118 0 99 0 1168
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	current 111 0 99 <1 1162 1463	history1 144 0 99 <1 1088 1423	history2 118 0 99 0 1168 1445
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150	current 111 0 99 <1 1162 1463 915	history1 144 0 99 <1 1088 1423 842	history2 118 0 99 0 1168 1445 918
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350	current 111 0 99 <1 1162 1463 915 1215	history1 144 0 99 <1 1088 1423 842 1072	history2 118 0 99 0 1168 1445 918 1168
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877	history1 144 0 99 <1 1088 1423 842 1072 3053	history2 118 0 99 0 1168 1445 918 1168 3236
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877 current	history1 144 0 99 <1 1088 1423 842 1072 3053 history1	history2 118 0 99 0 1168 1445 918 1168 3236 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877 current 4	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4	history2 118 0 99 0 1168 1445 918 1168 3236 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	current 111 0 99 <1 1162 1463 915 1215 2877 current 4	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	current 111 0 99 <1 1162 1463 915 1215 2877 current 4 2 1	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18 0	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3 2 3
ADDITIVES 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	method ASTM D5185m method	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877 current 4 2 1 current	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18 0 history1	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3 history2
ADDITIVES 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 ppm	method ASTM D5185m method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877 current 4 2 1 current 0.4	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18 0 history1 0.3	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3 history2 0.4
ADDITIVES 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	method ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	current 111 0 99 <1 1162 1463 915 1215 2877 current 4 2 1 current 0.4 13.5	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18 0 history1 0.3 12.7	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3 2 3 history2 0.4 12.1
ADDITIVES 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	method ASTM D5185m method *ASTM D5185m *ASTM D5185m *ASTM D5185m *ASTM D5185m *ASTM D5185m *ASTM D5185m *ASTM D7844 *ASTM D7624 *ASTM D7415	250 10 100 450 3000 1150 1350 4250 limit/base >20 limit/base >20 >30	current 111 0 99 <1 1162 1463 915 1215 2877 current 4 2 1 current 0.4 13.5 27.1	history1 144 0 99 <1 1088 1423 842 1072 3053 history1 4 18 0 history1 0.3 12.7 27.1	history2 118 0 99 0 1168 1445 918 1168 3236 history2 3 history2 0.4 12.1 27.4



OIL ANALYSIS REPORT



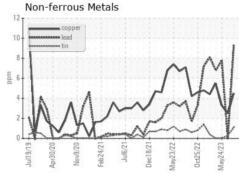


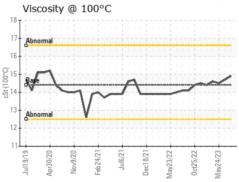
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

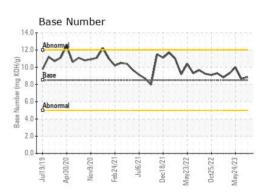
FLUID PROPERTIES		method				history2	
Visc @ 100°C	cSt	ASTM D445	14.4	14.9	14.7	14.5	

GRAPHS

Ferrous Alloys 25











Certificate L2367

Laboratory Sample No. Lab Number Test Package : IND 2

Unique Number

: WC0769239 : 05966521 : 10673072

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 02 Oct 2023 Diagnosed : 03 Oct 2023

Diagnostician : Sean Felton

MARATHON PETROLEUM CO.

101 12TH ST CATLETTSBURG, KY US 41169

Contact: M/V CANTON

mvcanton@marathonpetroleum.com T:

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)

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