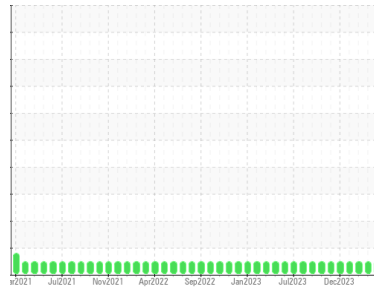




# OIL ANALYSIS REPORT

Sample Rating Trend



**NORMAL**



Area

**Paul G. Blazer**

Machine Id

**[Paul G. Blazer] Oil - Starboard Main Engine**

Component

**Starboard Main Engine**

Fluid

**DIESEL ENGINE OIL SAE 15W40 (150 GAL)**

## DIAGNOSIS

### Recommendation

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

### 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 INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		<b>WC0845838</b>	WC0719538	WC0845912
Sample Date	Client Info		<b>14 Apr 2024</b>	20 Mar 2024	10 Feb 2024
Machine Age	hrs	Client Info	<b>73425</b>	72921	72057
Oil Age	hrs	Client Info	<b>6185</b>	5681	4816
Oil Changed	Client Info		<b>Not Chngd</b>	N/A	Not Chngd
Sample Status			<b>NORMAL</b>	NORMAL	NORMAL

## CONTAMINATION

	method	limit/base	current	history1	history2
Fuel	WC Method	>4.0	<b>&lt;1.0</b>	<1.0	<1.0
Glycol	WC Method		<b>NEG</b>	NEG	NEG

## WEAR METALS

	method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m	>75	<b>12</b>	12	13
Chromium	ppm	ASTM D5185m	>8	<b>&lt;1</b>	0	<1
Nickel	ppm	ASTM D5185m	>2	<b>0</b>	0	0
Titanium	ppm	ASTM D5185m	>3	<b>0</b>	0	<1
Silver	ppm	ASTM D5185m	>2	<b>0</b>	0	0
Aluminum	ppm	ASTM D5185m	>15	<b>2</b>	2	1
Lead	ppm	ASTM D5185m	>18	<b>0</b>	0	<1
Copper	ppm	ASTM D5185m	>80	<b>0</b>	1	<1
Tin	ppm	ASTM D5185m	>14	<b>&lt;1</b>	0	0
Vanadium	ppm	ASTM D5185m		<b>0</b>	0	0
Cadmium	ppm	ASTM D5185m		<b>0</b>	0	0

## ADDITIVES

	method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185m	250	<b>37</b>	38	51
Barium	ppm	ASTM D5185m	10	<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185m	100	<b>70</b>	67	69
Manganese	ppm	ASTM D5185m		<b>&lt;1</b>	<1	<1
Magnesium	ppm	ASTM D5185m	450	<b>1455</b>	1377	1343
Calcium	ppm	ASTM D5185m	3000	<b>1333</b>	1295	1391
Phosphorus	ppm	ASTM D5185m	1150	<b>1021</b>	991	977
Zinc	ppm	ASTM D5185m	1350	<b>1250</b>	1195	1203
Sulfur	ppm	ASTM D5185m	4250	<b>3585</b>	3640	3219

## CONTAMINANTS

	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185m	>20	<b>3</b>	2	3
Sodium	ppm	ASTM D5185m	>158	<b>1</b>	<1	<1
Potassium	ppm	ASTM D5185m	>20	<b>&lt;1</b>	0	0
Water	%	ASTM D6304	>0.1	<b>NEG</b>	NEG	NEG

## INFRA-RED

	method	limit/base	current	history1	history2	
Soot %	%	*ASTM D7844		<b>2</b>	1.8	1.9
Nitration	Abs/cm	*ASTM D7624	>20	<b>9.9</b>	9.4	9.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	<b>23.3</b>	22.4	22.9

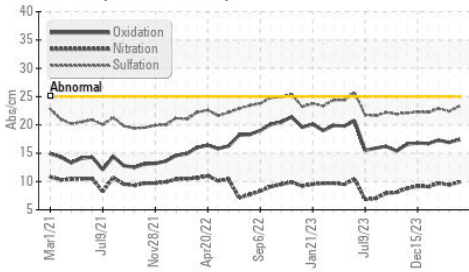
## FLUID DEGRADATION

	method	limit/base	current	history1	history2	
Oxidation	Abs/.1mm	*ASTM D7414	>25	<b>17.4</b>	16.9	17.3
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	<b>12.05</b>	12.36	12.49

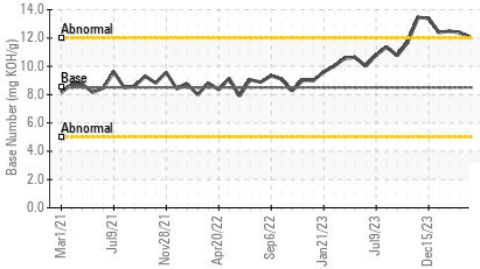


# OIL ANALYSIS REPORT

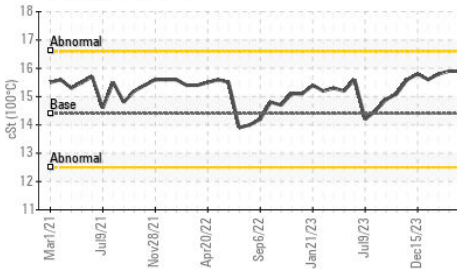
FT-IR (Direct Trend)



Base Number



Viscosity @ 100°C

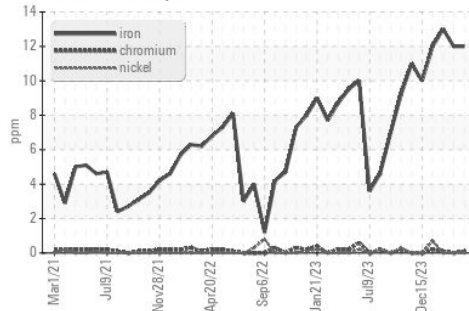


VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

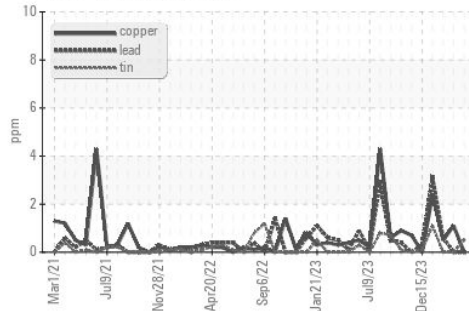
FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	15.9	15.8

## GRAPHS

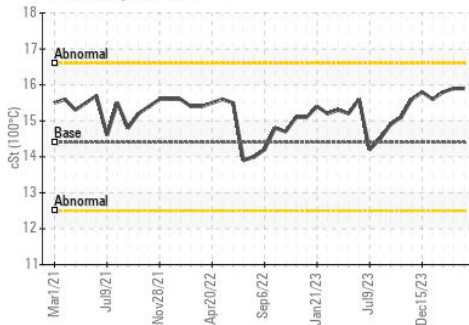
Ferrous Alloys



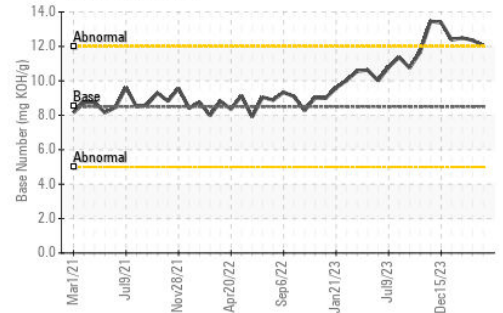
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

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

Sample No. : WC0845838

Lab Number : 06157876

Unique Number : 10993299

Test Package : IND 2 ( Additional Tests: KF )

Received : 23 Apr 2024

Tested : 25 Apr 2024

Diagnosed : 25 Apr 2024 - Sean Felton

MARATHON PETROLEUM CO.

101 12TH ST

CATLETTSBURG, KY

US 41169

Contact: CORY GUMBERT

cagumbert@marathonpetroleum.com

T: (606)585-3950

F: x:

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)