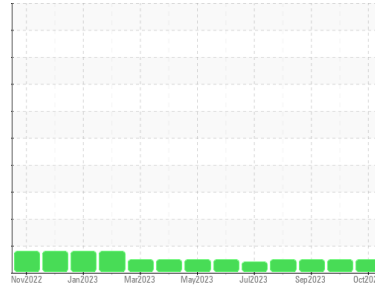




OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Area
West Virginia
 Machine Id
[West Virginia] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
MARATHON 15W40 (150 GAL)

DIAGNOSIS

Recommendation

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

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 acceptable for the time in service.

SAMPLE INFORMATION

method	limit/base	current	history1	history2
Sample Number	Client Info	WC0805457	WC0804881	WC0805331
Sample Date	Client Info	27 Oct 2023	01 Oct 2023	02 Sep 2023
Machine Age	hrs	39066	38557	37989
Oil Age	hrs	208	790	222
Oil Changed	Client Info	N/A	Not Changd	N/A
Sample Status		NORMAL	NORMAL	NORMAL

CONTAMINATION

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	2	4	2
Chromium	ppm ASTM D5185m >8	<1	<1	0
Nickel	ppm ASTM D5185m >2	<1	0	0
Titanium	ppm ASTM D5185m >3	<1	<1	<1
Silver	ppm ASTM D5185m >2	0	0	0
Aluminum	ppm ASTM D5185m >15	5	1	<1
Lead	ppm ASTM D5185m >18	0	0	<1
Copper	ppm ASTM D5185m >80	<1	4	3
Tin	ppm ASTM D5185m >14	<1	<1	<1
Vanadium	ppm ASTM D5185m	<1	<1	<1
Cadmium	ppm ASTM D5185m	<1	<1	0

ADDITIVES

method	limit/base	current	history1	history2
Boron	ppm ASTM D5185m	372	395	357
Barium	ppm ASTM D5185m	<1	0	0
Molybdenum	ppm ASTM D5185m	132	123	118
Manganese	ppm ASTM D5185m	0	<1	<1
Magnesium	ppm ASTM D5185m	662	655	644
Calcium	ppm ASTM D5185m	1437	1518	1531
Phosphorus	ppm ASTM D5185m	718	685	662
Zinc	ppm ASTM D5185m	854	812	802
Sulfur	ppm ASTM D5185m	3119	2454	2826

CONTAMINANTS

method	limit/base	current	history1	history2
Silicon	ppm ASTM D5185m >20	5	5	4
Sodium	ppm ASTM D5185m >75	3	1	<1
Potassium	ppm ASTM D5185m >20	2	2	2

INFRA-RED

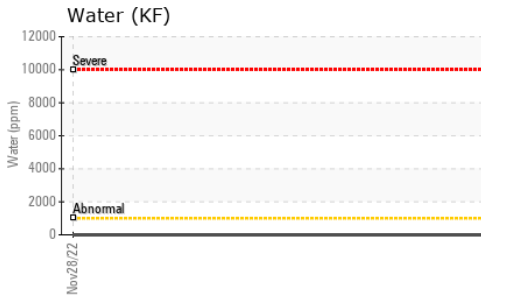
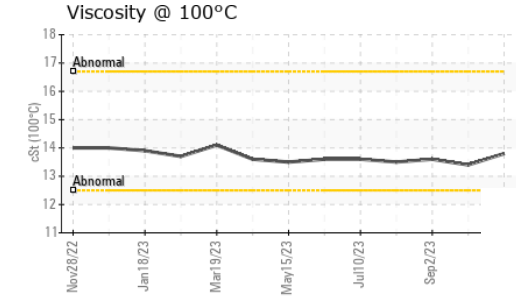
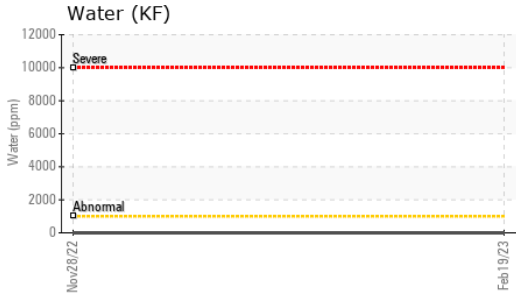
method	limit/base	current	history1	history2
Soot %	% *ASTM D7844	0.1	0.1	0.1
Nitration	Abs/cm *ASTM D7624 >20	5.0	5.9	5.1
Sulfation	Abs/.1mm *ASTM D7415 >30	22.5	22.1	22.5

FLUID DEGRADATION

method	limit/base	current	history1	history2
Oxidation	Abs/.1mm *ASTM D7414 >25	15.5	15.4	15.3
Base Number (BN)	mg KOH/g ASTM D2896	12.48	10.30	10.83



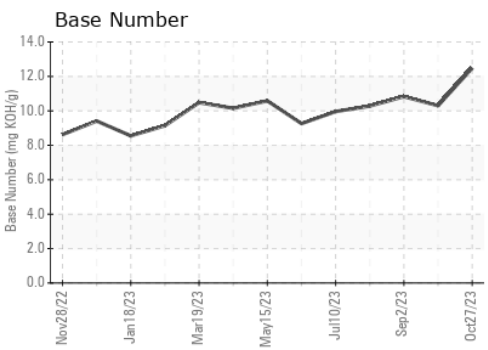
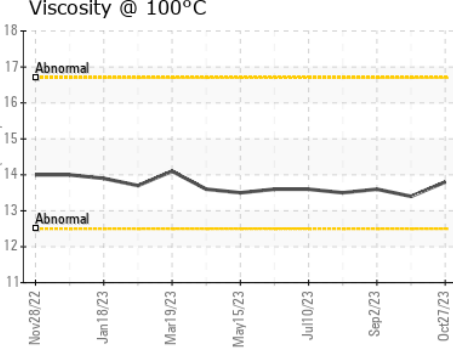
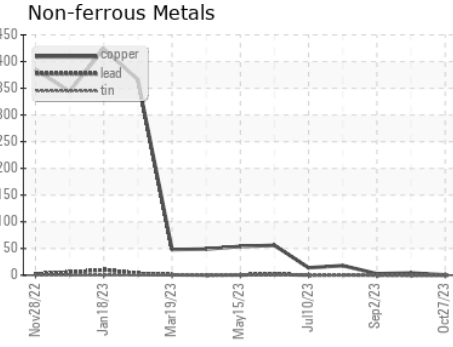
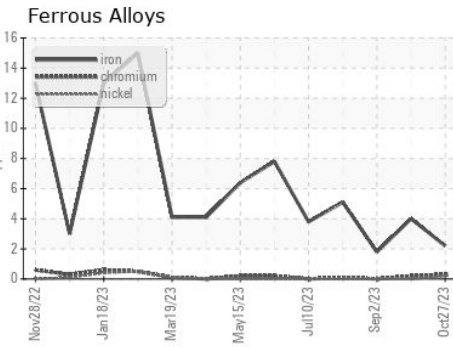
OIL ANALYSIS REPORT



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	13.8	13.4	13.6

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0805457 **Received** : 01 Nov 2023
Lab Number : **05995888** **Diagnosed** : 02 Nov 2023
Unique Number : 10724248 **Diagnostician** : Sean Felton
Test Package : IND 2 (Additional Tests: KF)

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 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)