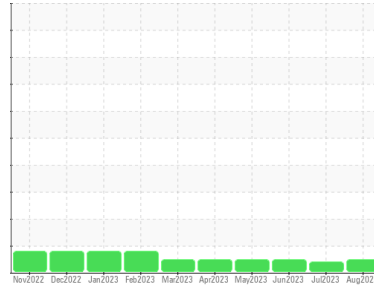




OIL ANALYSIS REPORT

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.

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		WC0769028	WC0735348	WC0769153
Sample Date	Client Info		06 Aug 2023	10 Jul 2023	12 Jun 2023
Machine Age	hrs	Client Info	37518	36950	36470
Oil Age	hrs	Client Info	892	324	1721
Oil Changed	Client Info		Not Chngd	N/A	Not Chngd
Sample Status			NORMAL	ABNORMAL	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	5	4	8
Chromium	ppm	ASTM D5185m >8	<1	0	<1
Nickel	ppm	ASTM D5185m >2	0	0	0
Titanium	ppm	ASTM D5185m >3	0	0	<1
Silver	ppm	ASTM D5185m >2	0	0	0
Aluminum	ppm	ASTM D5185m >15	4	2	2
Lead	ppm	ASTM D5185m >18	<1	<1	2
Copper	ppm	ASTM D5185m >80	18	14	56
Tin	ppm	ASTM D5185m >14	0	0	<1
Vanadium	ppm	ASTM D5185m	0	<1	<1
Cadmium	ppm	ASTM D5185m	0	0	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	292	301	306
Barium	ppm	ASTM D5185m	0	0	0
Molybdenum	ppm	ASTM D5185m	118	119	124
Manganese	ppm	ASTM D5185m	<1	<1	<1
Magnesium	ppm	ASTM D5185m	659	682	686
Calcium	ppm	ASTM D5185m	1516	1602	1683
Phosphorus	ppm	ASTM D5185m	691	694	696
Zinc	ppm	ASTM D5185m	822	866	861
Sulfur	ppm	ASTM D5185m	2909	3055	3033

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >20	5	4	5
Sodium	ppm	ASTM D5185m >75	0	0	1
Potassium	ppm	ASTM D5185m >20	0	<1	0

INFRA-RED

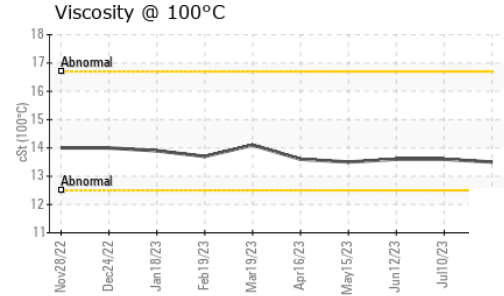
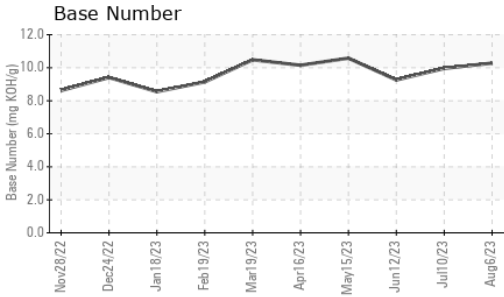
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	0.2	0.2	0.2
Nitration	Abs/cm	*ASTM D7624 >20	6.9	6.4	8.7
Sulfation	Abs/.1mm	*ASTM D7415 >30	22.9	23.6	24.6

FLUID DEGRADATION

	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	16.2	16.4	18.4
Base Number (BN)	mg KOH/g	ASTM D2896	10.28	9.96	9.26



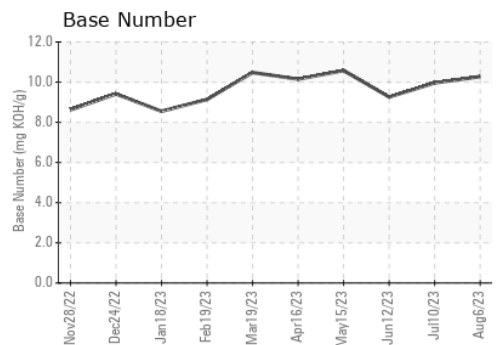
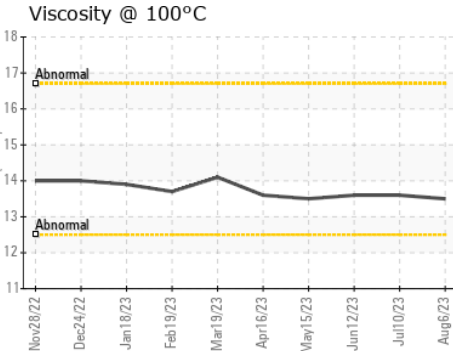
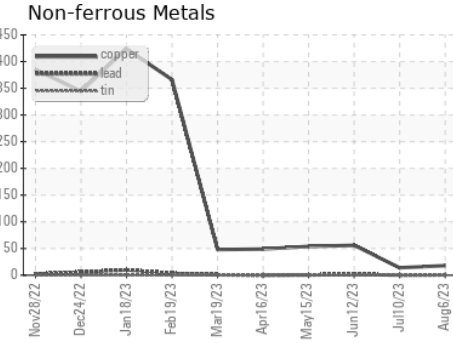
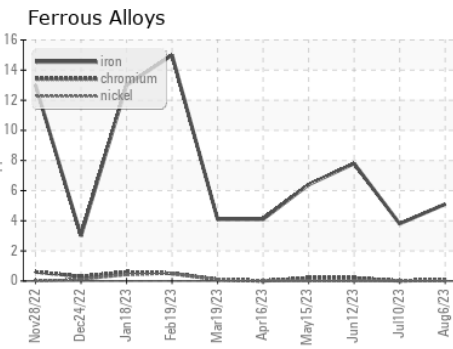
OIL ANALYSIS REPORT



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	▲ MODER
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	13.5	13.6	13.6

GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0769028 **Received** : 17 Aug 2023
Lab Number : **05927445** **Diagnosed** : 18 Aug 2023
Unique Number : 10607392 **Diagnostician** : Wes Davis
Test Package : IND 2

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)