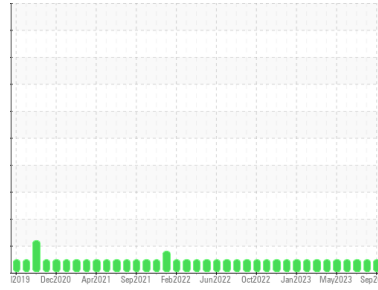




OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Area
Detroit
 Machine Id
[Detroit] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
MOBIL 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		WC0769339	WC0769393	WC0769387
Sample Date	Client Info		11 Sep 2023	14 Aug 2023	17 Jul 2023
Machine Age	hrs	Client Info	15324	14802	14353
Oil Age	hrs	Client Info	15324	14802	5934
Oil Changed	Client Info		N/A	Not Changd	Not Changd
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	63	60	61
Chromium	ppm	ASTM D5185m >8	<1	1	1
Nickel	ppm	ASTM D5185m >2	3	3	4
Titanium	ppm	ASTM D5185m >3	<1	0	0
Silver	ppm	ASTM D5185m >2	0	0	0
Aluminum	ppm	ASTM D5185m >15	<1	3	1
Lead	ppm	ASTM D5185m >18	10	9	8
Copper	ppm	ASTM D5185m >80	32	32	35
Tin	ppm	ASTM D5185m >14	2	2	2
Vanadium	ppm	ASTM D5185m	0	0	0
Cadmium	ppm	ASTM D5185m	0	0	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	55	65	61
Barium	ppm	ASTM D5185m	0	0	2
Molybdenum	ppm	ASTM D5185m	55	56	60
Manganese	ppm	ASTM D5185m	1	1	1
Magnesium	ppm	ASTM D5185m	1005	978	977
Calcium	ppm	ASTM D5185m	1758	1810	1619
Phosphorus	ppm	ASTM D5185m	996	1035	1063
Zinc	ppm	ASTM D5185m	1329	1337	1325
Sulfur	ppm	ASTM D5185m	3041	3628	3083

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >20	4	3	3
Sodium	ppm	ASTM D5185m >118	5	5	1
Potassium	ppm	ASTM D5185m >20	3	3	4

INFRA-RED

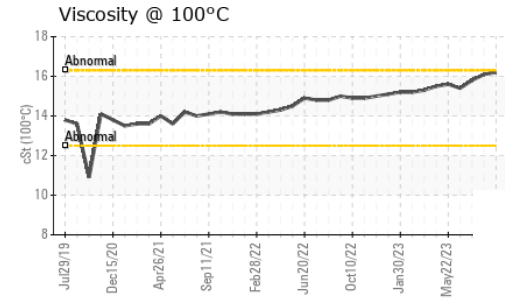
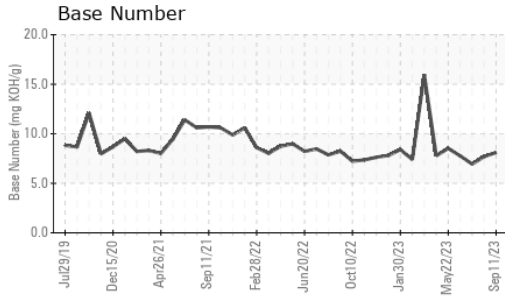
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	0.5	0.5	0.5
Nitration	Abs/cm	*ASTM D7624 >20	14.4	14.0	14.0
Sulfation	Abs/.1mm	*ASTM D7415 >30	28.0	27.9	27.9

FLUID DEGRADATION

	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	31.1	30.4	31.2
Base Number (BN)	mg KOH/g	ASTM D2896	8.11	7.70	6.94



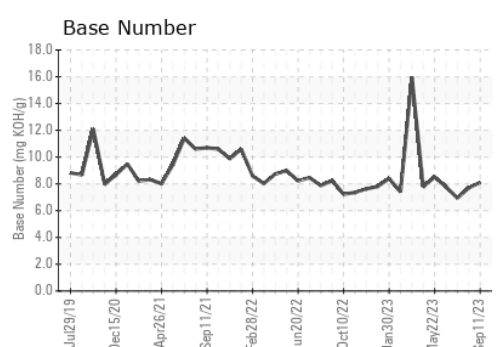
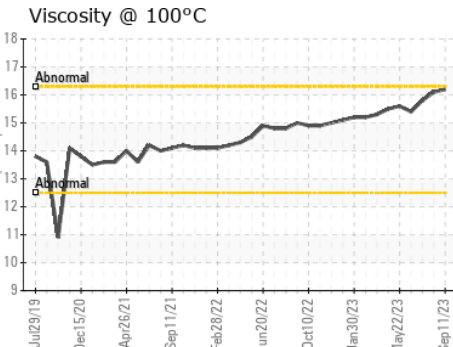
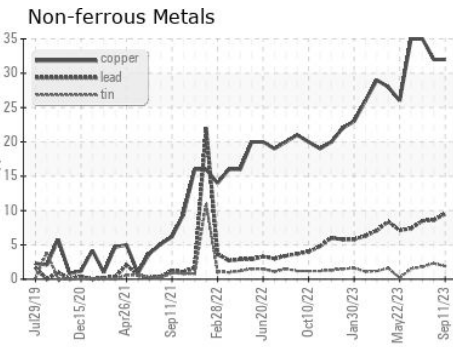
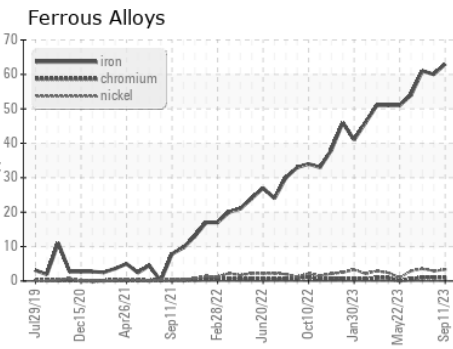
OIL ANALYSIS REPORT



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	16.2	16.1	15.8

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
 Sample No. : WC0769339
 Lab Number : 05966530
 Unique Number : 10673081
 Test Package : IND 2

Received : 02 Oct 2023
 Diagnosed : 03 Oct 2023
 Diagnostician : Sean Felton

MARATHON PETROLEUM CO.
 101 12TH ST
 CATLETTSBURG, KY
 US 41169

Contact: SHAWN MCCLASKEY
 stmccclaskey@marathonpetroleum.com
 T: (606)739-2416

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: