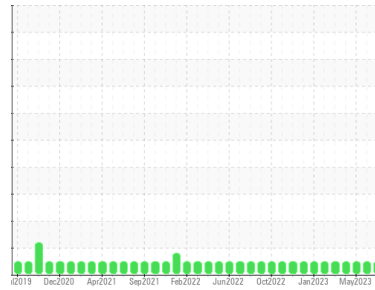




OIL ANALYSIS REPORT

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			WC0769387	WC0735770	WC0735658
Sample Date	Client Info			17 Jul 2023	19 Jun 2023	22 May 2023
Machine Age	hrs	Client Info		14353	13878	13388
Oil Age	hrs	Client Info		5934	1378	4971
Oil Changed	Client Info			Not Chngd	Not Chngd	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	61	54	51
Chromium	ppm	ASTM D5185m	>8	1	<1	0
Nickel	ppm	ASTM D5185m	>2	4	3	1
Titanium	ppm	ASTM D5185m	>3	0	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	1	0	5
Lead	ppm	ASTM D5185m	>18	8	7	7
Copper	ppm	ASTM D5185m	>80	35	35	26
Tin	ppm	ASTM D5185m	>14	2	2	<1
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		61	56	60
Barium	ppm	ASTM D5185m		2	0	0
Molybdenum	ppm	ASTM D5185m		60	57	56
Manganese	ppm	ASTM D5185m		1	<1	0
Magnesium	ppm	ASTM D5185m		977	894	1002
Calcium	ppm	ASTM D5185m		1619	1714	1610
Phosphorus	ppm	ASTM D5185m		1063	1044	1011
Zinc	ppm	ASTM D5185m		1325	1277	1299
Sulfur	ppm	ASTM D5185m		3083	3272	3260

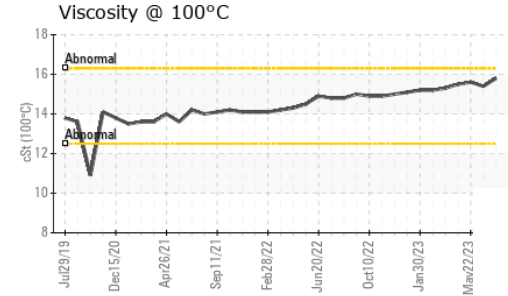
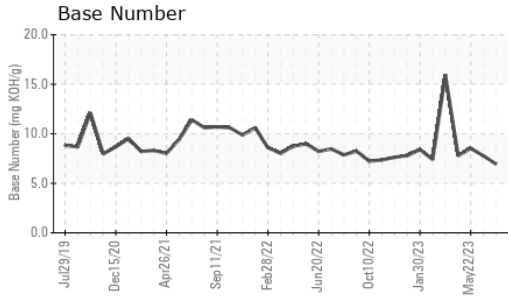
CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>20	3	3	3
Sodium	ppm	ASTM D5185m	>118	1	2	4
Potassium	ppm	ASTM D5185m	>20	4	4	1

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		0.5	0.4	0.5
Nitration	Abs/cm	*ASTM D7624	>20	14.0	12.8	13.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	27.9	27.0	28.0

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	31.2	29.6	30.4
Base Number (BN)	mg KOH/g	ASTM D2896		6.94	7.77	8.52



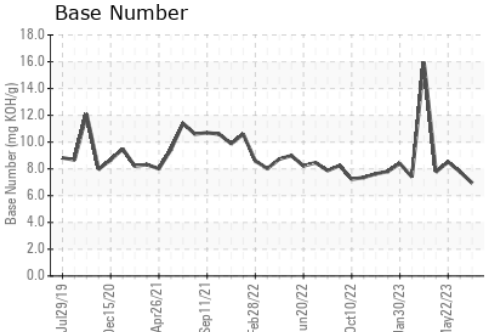
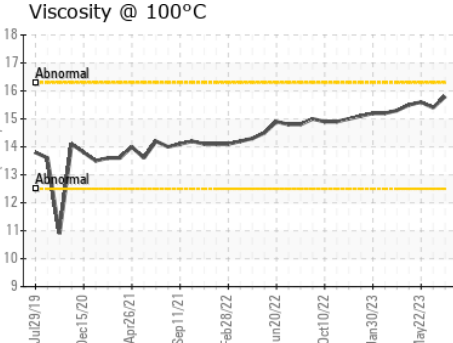
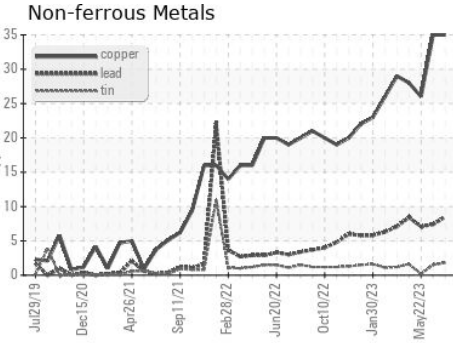
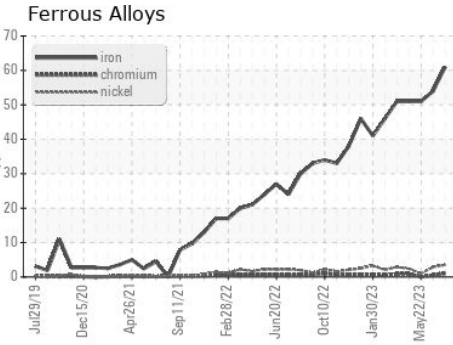
OIL ANALYSIS REPORT



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	15.8	15.4	15.6

GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0769387 **Received** : 21 Jul 2023
Lab Number : **05904532** **Diagnosed** : 26 Jul 2023
Unique Number : 10565888 **Diagnostician** : Don Baldrige
Test Package : IND 2

MARATHON PETROLEUM CO.
 101 12TH ST
 CATLETTSBURG, KY
 US 41169
 Contact: SHAWN MCCLASKEY
 stmccclaskey@marathonpetroleum.com
 T: (606)739-2416
 F: x:

Certificate L2367
 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)