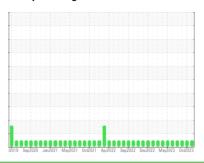


# **OIL ANALYSIS REPORT**

# Kentucky [Kentucky] Oil - Port Main Engine

Component
Port Main Engine
Fluid

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



Sample Rating Trend



### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the

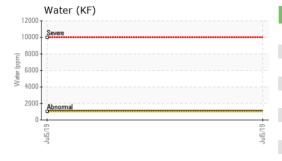
### **Fluid Condition**

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORM	/ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0805484	WC0805559	WC0769175
Sample Date		Client Info		30 Oct 2023	03 Oct 2023	25 Aug 2023
Machine Age	hrs	Client Info		10972	10439	9756
Oil Age	hrs	Client Info		843	310	3316
Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	V	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	4	3	9
Chromium	ppm	ASTM D5185m	>8	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	<1	0
Titanium	ppm	ASTM D5185m	>3	<1	0	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	1	2	2
Lead	ppm	ASTM D5185m	>18	<1	<1	3
Copper	ppm	ASTM D5185m	>80	2	1	5
Tin	ppm	ASTM D5185m	>14	0	<1	2
Vanadium	ppm	ASTM D5185m		0	0	<1
Cadmium	ppm	ASTM D5185m		<1	0	<1
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 29	history1 39	history2 25
	ppm					
Boron		ASTM D5185m	250	29	39	25
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	29 2	39 0	25 0
Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	29 2 46	39 0 53	25 0 56
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	29 2 46 0	39 0 53	25 0 56 1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	29 2 46 0 673	39 0 53 0 737	25 0 56 1 1214
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	29 2 46 0 673 1287	39 0 53 0 737 1400	25 0 56 1 1214 1695
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	29 2 46 0 673 1287 919	39 0 53 0 737 1400 1097	25 0 56 1 1214 1695 1101
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	29 2 46 0 673 1287 919 1130	39 0 53 0 737 1400 1097 1227	25 0 56 1 1214 1695 1101 1452
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	29 2 46 0 673 1287 919 1130 2911 current	39 0 53 0 737 1400 1097 1227 3643 history1	25 0 56 1 1214 1695 1101 1452 3982 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	29 2 46 0 673 1287 919 1130 2911	39 0 53 0 737 1400 1097 1227 3643 history1 4	25 0 56 1 1214 1695 1101 1452 3982 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	29 2 46 0 673 1287 919 1130 2911 current	39 0 53 0 737 1400 1097 1227 3643 history1	25 0 56 1 1214 1695 1101 1452 3982 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	29 2 46 0 673 1287 919 1130 2911 current 4	39 0 53 0 737 1400 1097 1227 3643 history1 4	25 0 56 1 1214 1695 1101 1452 3982 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	29 2 46 0 673 1287 919 1130 2911 current 4 3 2	39 0 53 0 737 1400 1097 1227 3643 history1 4 2 2	25 0 56 1 1214 1695 1101 1452 3982 history2 4 6 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	29 2 46 0 673 1287 919 1130 2911 current 4 3 2 current	39 0 53 0 737 1400 1097 1227 3643 history1 4 2 2 history1	25 0 56 1 1214 1695 1101 1452 3982 history2 4 6 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  Method  *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	29 2 46 0 673 1287 919 1130 2911 current 4 3 2 current 0.1	39 0 53 0 737 1400 1097 1227 3643 history1 4 2 2 history1 0.1	25 0 56 1 1214 1695 1101 1452 3982 history2 4 6 0 history2 0.2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  method  *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	29 2 46 0 673 1287 919 1130 2911 current 4 3 2 current 0.1 7.9	39 0 53 0 737 1400 1097 1227 3643 history1 4 2 2 history1 0.1 7.3	25 0 56 1 1214 1695 1101 1452 3982 history2 4 6 0 history2 0.2 10.3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  Method  *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844  *ASTM D7624  *ASTM D76145	250 10 100 450 3000 1150 1350 4250 limit/base >20 limit/base >20 >30	29 2 46 0 673 1287 919 1130 2911 current 4 3 2 current 0.1 7.9 21.0	39 0 53 0 737 1400 1097 1227 3643 history1 4 2 2 history1 0.1 7.3 20.1	25 0 56 1 1214 1695 1101 1452 3982 history2 4 6 0 history2 0.2 10.3 22.9



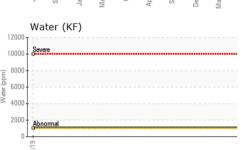
## **OIL ANALYSIS REPORT**

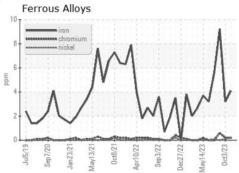


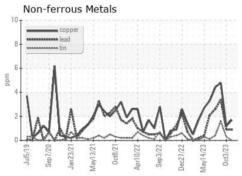
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance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

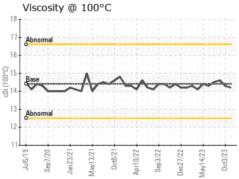
7 - Abnormal						
6-						
5 Base	 Α					
4 Dase	 / V	~	~~	<u>~</u>	~	
3						
Abnormal			- +			
3 - Abnormal			- +			
Abnormal			- +			

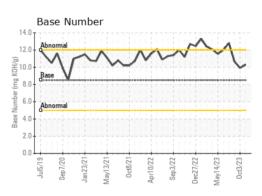
FLUID PROPE	RTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	14.4	14.2	14.3	14.6
GRAPHS						















Certificate L2367

Laboratory Sample No. Lab Number Unique Number : 10727575

: WC0805484 : 05999215

To discuss this sample report, contact Customer Service at 1-800-237-1369.

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

: 07 Nov 2023 Diagnostician : Sean Felton

: 06 Nov 2023

Test Package : IND 2 (Additional Tests: KF)

US 41169 Contact: CORY GUMBERT cagumbert@marathonpetroleum.com

\* - 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) T: (606)585-3950 F: x:

101 12TH ST

CATLETTSBURG, KY

MARATHON PETROLEUM CO.