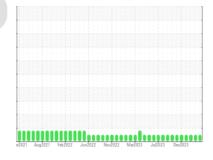


OIL ANALYSIS REPORT

Louisville [Louisville] Oil - Port Main Engine

Port Main Engine

DIESEL ENGINE OIL SAE 15W40 (150 GAL)



Sample Rating Trend



DIAGNOSIS

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

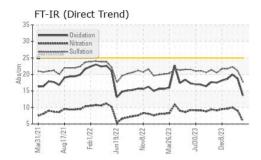
Fluid Condition

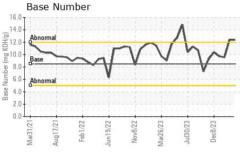
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

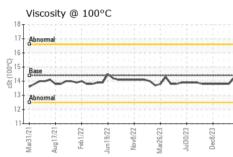
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0898520	WC0874801	WC0804842
Sample Date		Client Info		29 May 2024	28 Apr 2024	30 Jan 2024
Machine Age	hrs	Client Info		1355	950	39417
Oil Age	hrs	Client Info		355	950	6631
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	J	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	6	7
Chromium	ppm	ASTM D5185m	>8	<u>-</u> <1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	<1	0
Titanium	ppm	ASTM D5185m		0	<1	<1
Silver	ppm	ASTM D5185m	>2	0	<1	0
Aluminum	ppm	ASTM D5185m	>15	2	2	<1
Lead	ppm	ASTM D5185m	>18	0	1	3
Copper	ppm		>80	2	6	24
Tin		ASTM D5185m	>14	<1	1	<1
Vanadium	ppm	ASTM D5185m	>14	0	<1	0
Cadmium		ASTM D5185m		0	<1	0
	ppm	ASTIVI DOTOSIII		<u> </u>	< 1	0
ADDITIVES -						
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	250	10	20	10
	ppm ppm					
Boron	• •	ASTM D5185m	250	10	20	10
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	10 0	20 <1	10
Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	10 0 59	20 <1 61	10 0 61
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	10 0 59	20 <1 61 <1	10 0 61 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	10 0 59 0 1367	20 <1 61 <1 1396	10 0 61 <1 1477
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	10 0 59 0 1367 1096	20 <1 61 <1 1396 1186	10 0 61 <1 1477 1165
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	10 0 59 0 1367 1096 977	20 <1 61 <1 1396 1186 1067	10 0 61 <1 1477 1165 981
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	10 0 59 0 1367 1096 977 1188	20 <1 61 <1 1396 1186 1067 1238	10 0 61 <1 1477 1165 981 1283
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	10 0 59 0 1367 1096 977 1188 3440	20 <1 61 <1 1396 1186 1067 1238 3455	10 0 61 <1 1477 1165 981 1283 2833
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m 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	10 0 59 0 1367 1096 977 1188 3440 current	20 <1 61 <1 1396 1186 1067 1238 3455 history1	10 0 61 <1 1477 1165 981 1283 2833 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	10 0 59 0 1367 1096 977 1188 3440 current	20 <1 61 <1 1396 1186 1067 1238 3455 history1	10 0 61 <1 1477 1165 981 1283 2833 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	10 0 59 0 1367 1096 977 1188 3440 current 3	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5	10 0 61 <1 1477 1165 981 1283 2833 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	10 0 59 0 1367 1096 977 1188 3440 current 3 <1	20 <1 61 1396 1186 1067 1238 3455 history1 5 3 2	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG current	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG history1	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot %	ppm	ASTM D5185m ASTM D6304 method *ASTM D7844	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG current 0.1	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG history1 0.1	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG history2 0.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG current 0.1 5.9	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG history1 0.1 9.0	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG history2 0.1 10.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG current 0.1 5.9 17.8 current	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG history1 0.1 9.0 21.1 history1	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG history2 0.1 10.0 22.3 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D76145	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base >20	10 0 59 0 1367 1096 977 1188 3440 current 3 <1 2 NEG current 0.1 5.9 17.8	20 <1 61 <1 1396 1186 1067 1238 3455 history1 5 3 2 NEG history1 0.1 9.0 21.1	10 0 61 <1 1477 1165 981 1283 2833 history2 4 2 0 NEG history2 0.1 10.0 22.3



OIL ANALYSIS REPORT



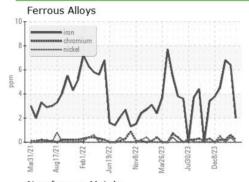


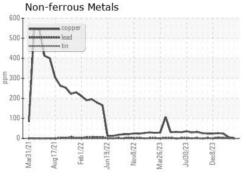


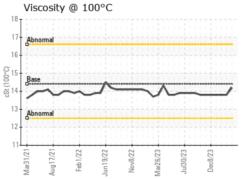
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

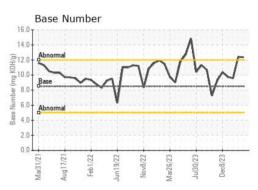
FLUID PROPERTIES		method	ilmit/base	current	nistory i	nistory2
Visc @ 100°C	cSt	ASTM D445	14.4	14.2	13.8	13.8

GRAPHS













Certificate 12367

Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Lab Number : 06204907

: WC0898520 Unique Number : 11072368

Received **Tested** Diagnosed

: 10 Jun 2024 : 13 Jun 2024

: 13 Jun 2024 - Sean Felton

MARATHON PETROLEUM CO. 101 12TH ST CATLETTSBURG, KY US 41169 Contact: CORY GUMBERT

cagumbert@marathonpetroleum.com T: (606)585-3950

Test Package : IND 2 (Additional Tests: KF) 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: