

OIL ANALYSIS REPORT

Nashville [Nashville] Oil - Port Main Engine

Port Main Engine

MOBIL 15W40 (210 GAL)



Sample Rating Trend



DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

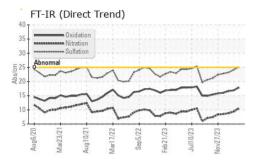
Fluid Condition

The oil viscosity is higher than normal. The BN result indicates that there is suitable alkalinity remaining in the oil.

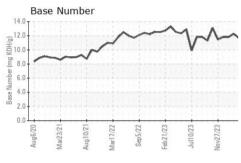
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Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		WC0874902	WC0846030	WC0846033
Oil Age hrs Client Info 3983 3444 2831 Oil Changed Sample Status Client Info Not Changd Filtered Not Changd NORMAL NORMAL	Sample Date		Client Info		18 Mar 2024	20 Feb 2024	22 Jan 2024
Oil Changed Client Info ABNORMAL NORMAL NORMAL NORMAL	Machine Age	hrs	Client Info		59106	58568	57954
ABNORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		3983	3444	2831
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0	Oil Changed		Client Info		Not Changd	Filtered	Not Changd
Fuel	Sample Status				ABNORMAL	NORMAL	NORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 12 10 9 Chromium ppm ASTM D5185m >8 0 <1	CONTAMINATION	N	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 12 10 9 Chromium ppm ASTM D5185m >8 0 <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >8 0 <1 <1 Nickel ppm ASTM D5185m >2 0 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>75	12	10	9
Titanium	Chromium	ppm	ASTM D5185m	>8	0	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>2	0	0	<1
Silver	Titanium		ASTM D5185m	>3	0	0	<1
Lead	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >80 <1 <1 2 Tin ppm ASTM D5185m >14 0 0 1 Vanadium ppm ASTM D5185m 0 0 <1	Aluminum	ppm	ASTM D5185m	>15	2	1	2
Tin	Lead	ppm	ASTM D5185m	>18	0	0	3
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 40 42 50 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 46 45 44 Manganese ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 11661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2	Copper	ppm	ASTM D5185m	>80	<1	<1	2
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 40 42 50 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 46 45 44 Manganese ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >20	Tin	ppm	ASTM D5185m	>14	0	0	1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 40 42 50 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 46 45 44 Manganese ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m	Vanadium	ppm	ASTM D5185m		0	0	<1
Boron	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 46 45 44 Manganese ppm ASTM D5185m -1 -1 2 Magnesium ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 46 45 44 Manganese ppm ASTM D5185m <1	Boron	ppm	ASTM D5185m		40	42	50
Manganese ppm ASTM D5185m <1 <1 2 Magnesium ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6185m >20 3 2 6 Water % ASTM D6185m >20 3 2 6 INFRA-RED method limit/base current history1 history2 Soot % "ASTM D7844 </td <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>0</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 1123 1088 979 Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration <t< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td></td><th>46</th><td>45</td><td>44</td></t<>	Molybdenum	ppm	ASTM D5185m		46	45	44
Calcium ppm ASTM D5185m 1661 1715 1514 Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D5185m >20 3 2 6 Water	Manganese	ppm	ASTM D5185m		<1	<1	2
Phosphorus ppm ASTM D5185m 1095 1022 989 Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D5185m >20 3 2 6 INFRA-RED method limit/base current history1 history2	Magnesium	ppm	ASTM D5185m		1123	1088	979
Zinc ppm ASTM D5185m 1376 1304 1256 Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D5185m >20 3 2 6 Water % ASTM D5185m >20 3 2 6 Water % ASTM D5185m >20 3 2 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7415 >30 25.1 24.1 23.2	Calcium	ppm	ASTM D5185m		1661	1715	1514
Sulfur ppm ASTM D5185m 3929 3425 3139 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 <td>Phosphorus</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>1095</th> <td>1022</td> <td>989</td>	Phosphorus	ppm	ASTM D5185m		1095	1022	989
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Zinc	ppm	ASTM D5185m		1376	1304	1256
Silicon ppm ASTM D5185m >20 2 2 3 Sodium ppm ASTM D5185m >118 1 1 3 Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Sulfur	ppm	ASTM D5185m		3929	3425	3139
Sodium							
Potassium ppm ASTM D5185m >20 3 2 6 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	CONTAMINANTS	5	method	limit/base	current	history1	history2
Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6							
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon	ppm	ASTM D5185m	>20	2	2	3
Soot % *ASTM D7844 2.9 2.4 2.1 Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon Sodium	ppm ppm	ASTM D5185m ASTM D5185m	>20 >118	2 1	2	3
Nitration Abs/cm *ASTM D7624 >20 10.5 9.4 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon Sodium Potassium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	>20 >118 >20	2 1 3	2 1 2	3 3 6
Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon Sodium Potassium Water	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304	>20 >118 >20 >0.1	2 1 3 NEG	2 1 2 NEG	3 3 6 NEG
Sulfation Abs/.1mm *ASTM D7415 >30 25.1 24.1 23.2 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon Sodium Potassium Water INFRA-RED	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304 method	>20 >118 >20 >0.1	2 1 3 NEG	2 1 2 NEG history1	3 3 6 NEG history2
Oxidation Abs/.1mm *ASTM D7414 >25 17.9 16.9 16.6	Silicon Sodium Potassium Water INFRA-RED Soot %	ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304 method *ASTM D7844	>20 >118 >20 >0.1 limit/base	2 1 3 NEG current 2.9	2 1 2 NEG history1 2.4	3 3 6 NEG history2 2.1
	Silicon Sodium Potassium Water INFRA-RED Soot % Nitration	ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624	>20 >118 >20 >0.1 limit/base	2 1 3 NEG current 2.9 10.5	2 1 2 NEG history1 2.4 9.4	3 3 6 NEG history2 2.1 8.8
	Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm % % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D7415	>20 >118 >20 >0.1 limit/base >20 >30	2 1 3 NEG current 2.9 10.5 25.1	2 1 2 NEG history1 2.4 9.4 24.1	3 3 6 NEG history2 2.1 8.8 23.2
	Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	>20 >118 >20 >0.1 limit/base >20 >30 limit/base	2 1 3 NEG current 2.9 10.5 25.1	2 1 2 NEG history1 2.4 9.4 24.1 history1	3 3 6 NEG history2 2.1 8.8 23.2 history2

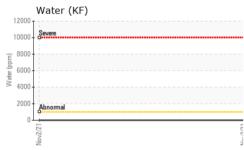


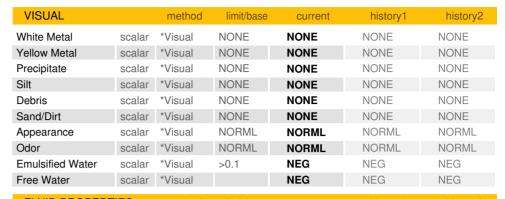
OIL ANALYSIS REPORT



	12000 -	Water (KF)															
	10000	Severe																
(m	8000																	
Water (ppm)	6000																	
W	4000 -																	
	2000 -	Abnormal															_	
	0	- 12		_	_	_	_	_	_	_	-	_	-	-	_	_	2.1	17
		Nov2/2															10.00 M	Nove/

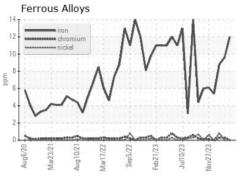


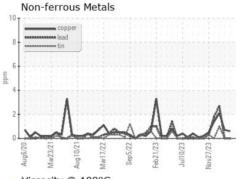


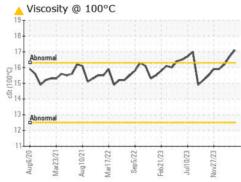


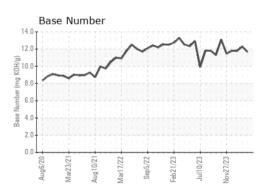
FLUID PROPER	11123	memod	iiiiii/base	current	HISTORY	HIStory
Visc @ 100°C	cSt	ASTM D445	_	17.1	16.7	16.2

GRAPHS













Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Lab Number : 06140137

: WC0874902 Unique Number : 10964945

Received **Tested**

: 05 Apr 2024 : 09 Apr 2024 Diagnosed

: 09 Apr 2024 - Sean Felton

101 12TH ST CATLETTSBURG, KY US 41169 Contact: CORY GUMBERT

MARATHON PETROLEUM CO.

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

Test Package : IND 2 (Additional Tests: KF) Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369.

 st - 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)

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