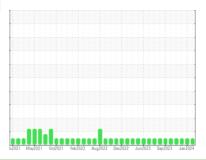


OIL ANALYSIS REPORT

Tri State [Tri State] Oil - Port Main Engine

Port Main Engine

DIESEL ENGINE OIL SAE 15W40 (37 GAL)



Sample Rating Trend



NORMAL

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

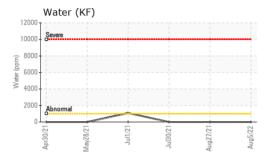
Fluid Condition

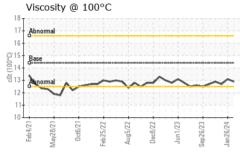
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

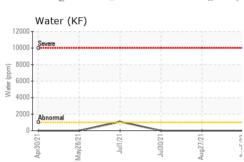
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0859917	WC0845752	WC0769589
Sample Date		Client Info		26 Feb 2024	26 Jan 2024	22 Dec 2023
Machine Age	hrs	Client Info		21950	21268	20619
Oil Age	hrs	Client Info		663	561	1119
Oil Changed		Client Info		Changed	Oil Added	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	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	0
Chromium	ppm	ASTM D5185m	>8	0	<1	1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>3	0	<1	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	0	<1	2
Lead	ppm	ASTM D5185m	>18	0	<1	0
Copper	ppm	ASTM D5185m	>80	2	2	0
Tin	ppm	ASTM D5185m	>14	0	0	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	250	7	8	5
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	7 0	8	5 4
Boron Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250	7 0 57	8 0 60	5 4 65
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	7 0 57 0	8 0 60 <1	5 4 65 0
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	7 0 57 0 1474	8 0 60 <1 1463	5 4 65 0 1414
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	7 0 57 0 1474 1139	8 0 60 <1 1463 1111	5 4 65 0 1414 1133
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm 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	7 0 57 0 1474 1139 946	8 0 60 <1 1463 1111 1076	5 4 65 0 1414 1133 1073
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	7 0 57 0 1474 1139 946 1228	8 0 60 <1 1463 1111 1076 1291	5 4 65 0 1414 1133 1073 1247
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	250 10 100 450 3000 1150 1350 4250	7 0 57 0 1474 1139 946 1228 3703	8 0 60 <1 1463 1111 1076 1291 3513	5 4 65 0 1414 1133 1073 1247 3837
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	7 0 57 0 1474 1139 946 1228 3703	8 0 60 <1 1463 1111 1076 1291 3513 history1	5 4 65 0 1414 1133 1073 1247 3837 history2
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	7 0 57 0 1474 1139 946 1228 3703 current	8 0 60 <1 1463 1111 1076 1291 3513 history1	5 4 65 0 1414 1133 1073 1247 3837 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	7 0 57 0 1474 1139 946 1228 3703 current 2	8 0 60 <1 1463 1111 1076 1291 3513 history1 3	5 4 65 0 1414 1133 1073 1247 3837 history2 0
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	7 0 57 0 1474 1139 946 1228 3703 current 2 0	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 0
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	7 0 57 0 1474 1139 946 1228 3703 current 2 0 0	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG	5 4 65 0 1414 1133 1073 1247 3837 history2 0 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	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot %	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	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG history1 0.1	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2
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	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current 0.1 10.5	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG history1 0.1 8.4	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2 0.1 10.2
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	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current 0.1 10.5 21.5	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG history1 0.1 8.4 20.6	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2 0.1 10.2 21.4
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 D7624 *ASTM D7624 *ASTM D7615 method	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current 0.1 10.5 21.5 current	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG history1 0.1 8.4 20.6 history1	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2 0.1 10.2 21.4 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 >0.1 limit/base >20 >30 limit/base	7 0 57 0 1474 1139 946 1228 3703 current 2 0 NEG current 0.1 10.5 21.5	8 0 60 <1 1463 1111 1076 1291 3513 history1 3 1 0 NEG history1 0.1 8.4 20.6	5 4 65 0 1414 1133 1073 1247 3837 history2 0 0 NEG history2 0.1 10.2 21.4



OIL ANALYSIS REPORT

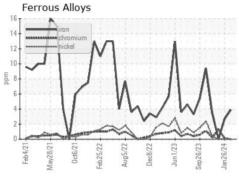


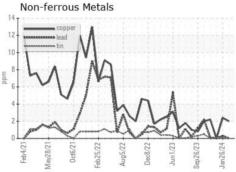


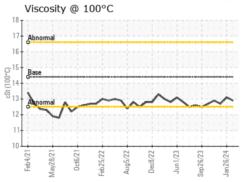


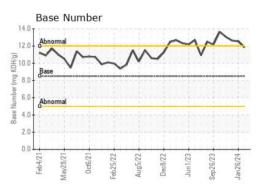
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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			history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	12.9	13.1	12.7













Laboratory Sample No. Lab Number : 06122619

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0859917

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

Received **Tested** Unique Number : 10936770

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

: 21 Mar 2024 : 21 Mar 2024 - Jonathan Hester

: 19 Mar 2024

MARATHON PETROLEUM CO.

101 12TH ST CATLETTSBURG, KY

US 41169 Contact: CORY GUMBERT

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

* - 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)

Report Id: MARCAT [WUSCAR] 06122619 (Generated: 03/21/2024 19:40:12) Rev: 1

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