

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL

Area Findlay [Findlay] Oil - Port Main Engine

Port Main Engine

Fluid MARATHON 15W40 (220 GAL)

Recommendation

Resample at the next service interval to monitor.

Wear

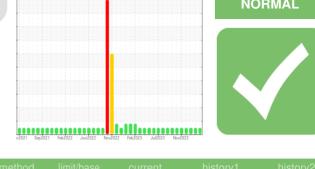
All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

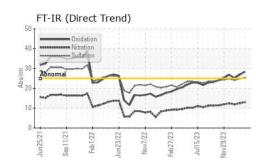
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

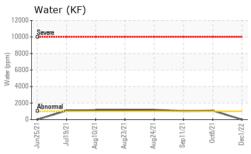


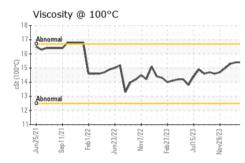
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0845864	WC0845865	WC0859882
Sample Date		Client Info		19 Mar 2024	23 Feb 2024	24 Jan 2024
Machine Age	hrs	Client Info		12609	12040	11389
Oil Age	hrs	Client Info		9422	9053	8391
Oil Changed		Client Info		Filtered	Not Changd	Filtered
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	١	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	13	10	11
Chromium	ppm	ASTM D5185m	>8	<1	0	<1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>3	0	0	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	2	0	1
Lead	ppm	ASTM D5185m	>18	14	10	12
Copper	ppm	ASTM D5185m	>80	61	56	53
Tin	ppm	ASTM D5185m	>14	<1	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
			11 1. 0			
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	limit/base	current 24	history1 29	history2 24
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	24	29	24
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	24 0	29 0	24 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	24 0 48	29 0 44	24 0 56
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	24 0 48 <1	29 0 44 0	24 0 56 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	24 0 48 <1 1231	29 0 44 0 1193	24 0 56 <1 1140
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		24 0 48 <1 1231 1568	29 0 44 0 1193 1573	24 0 56 <1 1140 1536
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	Imit/base	24 0 48 <1 1231 1568 1094	29 0 44 0 1193 1573 921	24 0 56 <1 1140 1536 1020
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	24 0 48 <1 1231 1568 1094 1349	29 0 44 0 1193 1573 921 1242	24 0 56 <1 1140 1536 1020 1276
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm 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		24 0 48 <1 1231 1568 1094 1349 3240	29 0 44 0 1193 1573 921 1242 2911	24 0 56 <1 1140 1536 1020 1276 2788
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	limit/base	24 0 48 <1 1231 1568 1094 1349 3240 current	29 0 44 0 1193 1573 921 1242 2911 history1	24 0 56 <1 1140 1536 1020 1276 2788 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	limit/base	24 0 48 <1 1231 1568 1094 1349 3240 current 2	29 0 44 0 1193 1573 921 1242 2911 history1 2	24 0 56 <1 1140 1536 1020 1276 2788 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base >20 >75 >20	24 0 48 <1 1231 1568 1094 1349 3240 current 2 3	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20	24 0 48 <1 1231 1568 1094 1349 3240 <u>current</u> 2 3 3 3	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20 >0.1	24 0 48 <1 1231 1568 1094 1349 3240 current 2 3 3 3 NEG	29 0 44 0 1193 1573 921 1242 2911 history1 2 2 <1 <1 <1 NEG	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 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	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20 >0.1	24 0 48 <1 1231 1568 1094 1349 3240 current 2 3 3 3 NEG current	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1 ×1 NEG history1	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 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 D5185m	limit/base >20 >75 >20 >0.1 limit/base	24 0 48 <1 1231 1568 1094 1349 3240 current 2 3 3 NEG current 0.1	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1 <1 NEG history1 0.1	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 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 D5185m	limit/base >20 >75 >20 >0.1 limit/base	24 0 48 <1 1231 1568 1094 1349 3240 current 2 3 3 NEG 0.1 13.0	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1 NEG history1 0.1 12.5	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 NEG NEG history2 0.1 11.9
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 •ASTM D7844 *ASTM D7844	Iimit/base >20 >75 >20 >0.1 Iimit/base >20 >30 Sandard State	24 0 48 <1 1231 1568 1094 1349 3240 Current 2 3 3 2 8 NEG 0.1 13.0 25.4 Current	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1 <1 NEG history1 0.1 12.5 24.8 history1	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 NEG history2 0.1 11.9 24.1 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 D5185m	Imit/base >20 >75 >20 >0.1 Imit/base ≥20 >0.1 Simit/base >20 >30	24 0 48 <1 1231 1568 1094 1349 3240 <u>current</u> 2 3 3 3 NEG <u>current</u> 0.1 13.0 25.4	29 0 44 0 1193 1573 921 1242 2911 history1 2 <1 <1 ×1 NEG history1 0.1 12.5 24.8	24 0 56 <1 1140 1536 1020 1276 2788 history2 3 2 2 NEG history2 0.1 11.9 24.1

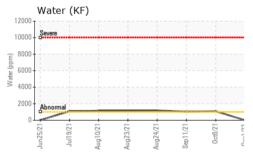


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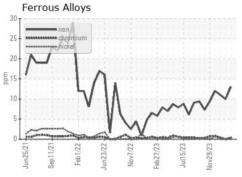


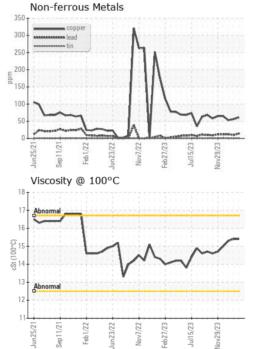


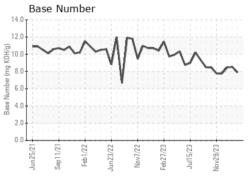




VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445		15.4	15.4	15.3







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. : WC0845864 Sample No. Received : 05 Apr 2024 101 12TH ST Lab Number : 06140121 Tested : 09 Apr 2024 CATLETTSBURG, KY Unique Number : 10964929 Diagnosed : 09 Apr 2024 - Sean Felton US 41169 Test Package : IND 2 (Additional Tests: KF) Contact: CORY GUMBERT Certificate 12367 cagumbert@marathonpetroleum.com To discuss this sample report, contact Customer Service at 1-800-237-1369. T: (606)585-3950 * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. F: x:

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Report Id: MARCAT [WUSCAR] 06140121 (Generated: 04/09/2024 18:28:29) Rev: 1

Submitted By: M/V FINDLAY