

OIL ANALYSIS REPORT

Area Kenova [Kenova] Oil - Starboard Main Engine

Starboard Main Engine

Fluid DIESEL ENGINE OIL SAE 15W40 (150 GAL)

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: ADAM Fields)

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.

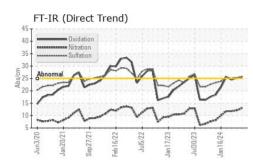


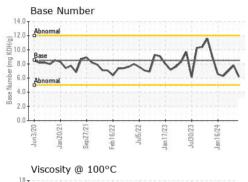
Sample Rating Trend

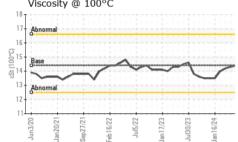
SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0874915	WC0860077	WC0859748
Sample Date		Client Info		05 Jun 2024	06 May 2024	10 Apr 2024
Machine Age	hrs	Client Info		42002	41386	40857
Oil Age	hrs	Client Info		5705	5088	4562
Oil Changed		Client Info		N/A	Not Changd	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	N	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		>75	36	33	25
Chromium	ppm	ASTM D5185m		<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	<1	0
Titanium	ppm	ASTM D5185m		<1	<1	0
Silver	ppm	ASTM D5185m		0	<1	0
Aluminum	ppm	ASTM D5185m		4	3	3
Lead	ppm	ASTM D5185m	>18	13	13	9
Copper	ppm	ASTM D5185m		68	61	38
Tin	ppm	ASTM D5185m	>14	<1	1	<1
Vanadium	ppm	ASTM D5185m		<1	<1	0
Cadmium	ppm	ASTM D5185m		<1	<1	0
ADDITIVES		method	limit/base	current	history1	history2
	maa				history1 84	history2 108
ADDITIVES Boron Barium	ppm ppm	ASTM D5185m	limit/base 250 10	73		
Boron Barium	ppm		250		84	108
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	250 10	73 0	84 <1	108 0
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	73 0 99	84 <1 95	108 0 91
Boron Barium Molybdenum	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	73 0 99 <1	84 <1 95 <1	108 0 91 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	73 0 99 <1 651	84 <1 95 <1 590	108 0 91 <1 633
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	73 0 99 <1 651 1734	84 <1 95 <1 590 1713	108 0 91 <1 633 1686
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	250 10 100 450 3000 1150	73 0 99 <1 651 1734 702	84 <1 95 <1 590 1713 689	108 0 91 <1 633 1686 688
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm 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 1350	73 0 99 <1 651 1734 702 883	84 <1 95 <1 590 1713 689 845	108 0 91 <1 633 1686 688 817
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	250 10 100 450 3000 1150 1350 4250	73 0 99 <1 651 1734 702 883 2762	84 <1 95 <1 590 1713 689 845 2688	108 0 91 <1 633 1686 688 817 2954
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	250 10 100 450 3000 1150 1350 4250	73 0 99 <1 651 1734 702 883 2762 current	84 <1 95 <1 590 1713 689 845 2688 history1	108 0 91 <1 633 1686 688 817 2954 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	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	250 10 100 450 3000 1150 1350 4250 limit/base >20	73 0 99 <1 651 1734 702 883 2762 2762 current 5	84 <1 95 <1 590 1713 689 845 2688 history1 5	108 0 91 <1 633 1686 688 817 2954 history2 6
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 ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	73 0 99 <1 651 1734 702 883 2762 2762 current 5 6	84 <1 95 <1 590 1713 689 845 2688 history1 5 5	108 0 91 <1 633 1686 688 817 2954 history2 6 5
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	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20	73 0 99 <1 651 1734 702 883 2762 current 5 6 2	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 3	108 0 91 <1 633 1686 688 817 2954 bistory2 6 5 <1
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	250 10 100 450 3000 1150 1350 4250 imit/base >20 >158 >20 >0.1	73 0 99 <1 651 1734 702 883 2762 2762 current 5 6 2 2 NEG	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 3 3 NEG	108 0 91 <1 633 1686 688 817 2954 history2 6 5 <1 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 D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1	73 0 99 <1 651 1734 702 883 2762 <i>current</i> 5 6 2 <i>NEG</i> <i>current</i> 0.8	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 3 NEG history1	108 0 91 <1 633 1686 688 817 2954 history2 6 5 <1 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	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1	73 0 99 <1 651 1734 702 883 2762 current 5 6 2 2 NEG	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 5 3 NEG history1 0.6	108 0 91 <1 633 1686 688 817 2954 history2 6 5 <1 NEG history2 0.6
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	250 10 100 450 3000 1150 1350 4250 20 >20 >158 >20 >0.1 imit/base 20 >0.1	73 0 99 <1 651 1734 702 883 2762 <i>current</i> 5 6 2 NEG NEG 0.8 13.0	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 3 NEG history1 0.6 12.1	108 0 91 <1 633 1686 688 817 2954 history2 6 5 <1 NEG history2 0.6 11.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Vater INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 Imit/base >20 >158 >20 >0.1 Imit/base >20 >0.1	73 0 99 <1 651 1734 702 883 2762 current 5 6 2 current 0.8 13.0 25.7	84 <1 95 <1 590 1713 689 845 2688 history1 5 5 5 3 NEG history1 0.6 12.1 25.2	108 0 91 <1 633 1686 688 817 2954 history2 6 5 <1 NEG history2 0.6 11.8 25.1



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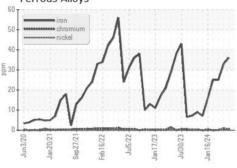


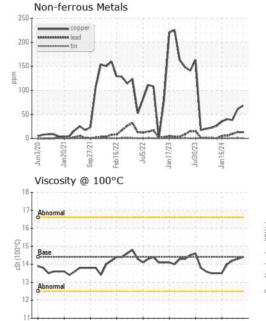


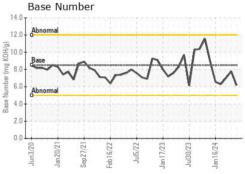


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	14.4	14.4	14.3	14.2
GRAPHS						

Ferrous Alloys







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. Sample No. : WC0874915 Received : 14 Jun 2024 101 12TH ST Lab Number : 06210368 Tested : 18 Jun 2024 CATLETTSBURG, KY Unique Number : 11083232 Diagnosed : 18 Jun 2024 - Don Baldridge US 41169 Test Package : IND 2 (Additional Tests: KF) Contact: CORY GUMBERT Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. cagumbert@marathonpetroleum.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (606)585-3950 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: x:

Jan 16/24

Jan 17/23

Jun3/20

Sep27/21

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Jan 20/21

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Submitted By: M/V KENOVA

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