

## **OIL ANALYSIS REPORT**

### Area Kenova [Kenova] Oil - Starboard Genset

Starboard Genset

Fluid DIESEL ENGINE OIL SAE 15W40 (8 GAL)

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

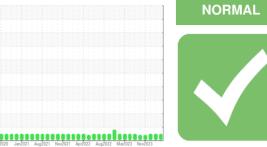
All component wear rates are normal.

#### 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.



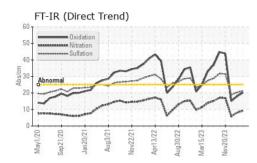
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Sample Rating Trend

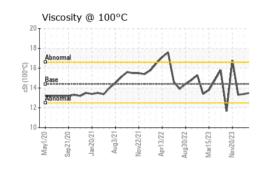
Sample Number Client Info WC0859756 WC0859756 WC0859751 WC08059717   Sample Date Client Info 06 May 202 10 Apr 2024 16 Jan 2024   Machine Age hrs Client Info 2000 1526 490   Oil Age hrs Client Info 2000 1526 490   Oil Age Client Info Nor Changd NA Not Changd   Sample Status Image Client Info Nor Changd NA Nor MAL   CONTAMINATION method Imit/base current history 1.0 <1.0   Fuel WC Method >4.0 <1.0 <1.0 <1.0 <1.0   Silver ppm ASTM 051656 >4 2 <1 <1 <1   Nickel ppm ASTM 051656 >12 2	SAMPLE INFORM	<b>MATION</b>	method	limit/base	current	history1	history2
Machine Age hrs Client Info 2000 1526 490   Oil Age Irrs Client Info 2000 1526 490   Oil Changed Client Info Nort Changd N/A Not Changd   Sample Status Imit/base current Inistory1 NIEG NEG   Fuel WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method >4.0 <1.0 <1.0 <1.0   WEAR METALS method Imit/base current history1 history2   Iron ppm ASTM D5185 >5.0 38 38 18   Chromium ppm ASTM D5185 >2 <1 0 <1   Nickel ppm ASTM D5185 >2 <1 0 <1   Aluminum ppm ASTM D5185 >7 11 7 6   Titanium ppm ASTM D5185 >7 11 0 <1   Aluminum	Sample Number		Client Info		WC0859756	WC0859751	WC0805217
Oil Age hrs Client Info 2000 1526 490   Oil Changed Client Info Not Changed N/A Not Changed   Sample Status Image Image NORMAL NORMAL NORMAL   CONTAMINATION method imilibase current history1 history2   Fuel WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method >4.0 2 <1 <1 <1   formium ppm ASTM D5185m >50 38 38 18   Chromium ppm ASTM D5185m >50 1 0 <1 1	Sample Date		Client Info		06 May 2024	10 Apr 2024	16 Jan 2024
Oil Changed Sample Status Client Info Not Changd NORMAL N/A Not Changd NORMAL   CONTAMINATION method limit/base current history1 history2   Fuel WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method >50 38 38 18   Chromium ppm ASTM D5185m >50 38 38 18   Chromium ppm ASTM D5185m >50 38 38 18   Chromium ppm ASTM D5185m >5 <1 0 <1   Nickel ppm ASTM D5185m >17 10 8 8   Copper ppm ASTM D5185m >17 10 8 8   Copper ppm ASTM D5185m >17 10 3 131   Barium ppm ASTM D5185m >17 10 <1 0 <t< th=""><th>Machine Age</th><th>hrs</th><th>Client Info</th><th></th><th>2000</th><th>1526</th><th>490</th></t<>	Machine Age	hrs	Client Info		2000	1526	490
Sample Status Image: Status NORMAL NORMAL NORMAL NORMAL NORMAL   CONTAMINATION method imilibase current history1 history2   Fuel WC Method >4.0 <1.0 <1.0 <1.0   Glycol WC Method NEG NEG NEG   WEAR METALS method limil/base current history1 history2   Iron ppm ASTM D5185n >50 38 38 18   Chromium ppm ASTM D5185n >2 <1 0 <1   Nickel ppm ASTM D5185n >2 <1 0 <1   Silver ppm ASTM D5185n >12 2 2 2   Lead ppm ASTM D5185n >15 2 2 2   Vanadium ppm ASTM D5185n <1 0 <1   Cadmium ppm ASTM D5185n 250 67 93 131	Oil Age	hrs	Client Info		2000	1526	490
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Nickel ppm ASTM D5185m >2 <1	Chromium		ASTM D5185m	>4	2	<1	<1
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Sulfur ppm ASTM D5185m 4250 2798 3337 3134   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 11 11 10   Sodium ppm ASTM D5185m >158 7 7 8   Potassium ppm ASTM D5185m >20 2 <1 3   Water % ASTM D6304 >0.1 NEG NEG NEG   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 0.2 0.1 0.1   Nitration Abs/cm *ASTM D7624 >20 9.3 8.1 5.9   Sulfation Abs/.1mm *ASTM D7844 20 9.3 8.1 5.9   Sulfation Abs/.1mm *ASTM D7624 >20 9.3 8.1 5.9   Sulfation Abs/.1mm *ASTM D7624 >20 </th <th>Boron Barium Molybdenum Manganese Magnesium</th> <th>ppm ppm ppm ppm</th> <th>ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m</th> <th>250 10 100 450</th> <th>67 1 76 4 483</th> <th>93 0 74 4 468</th> <th>131 &lt;1 63 5 410</th>	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	67 1 76 4 483	93 0 74 4 468	131 <1 63 5 410
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Potassium ppm ASTM D5185m >20 2 <1	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	67 1 76 4 483 1806 893 1183 2798	93 0 74 4 468 1837 961 1218 3337	131 <1 63 5 410 1772 1017 1254 3134
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Soot % % *ASTM D7844 0.2 0.1 0.1   Nitration Abs/cm *ASTM D7624 >20 9.3 8.1 5.9   Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.0   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.1mm *ASTM D7414 >25 20.2 18.0 15.1	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 <b>method</b> ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158	67 1 76 4 483 1806 893 1183 2798 current 11 7	93 0 74 4 468 1837 961 1218 3337 history1 11 7	131 <1 63 5 410 1772 1017 1254 3134 <u>history2</u> 10 8
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Nitration Abs/cm *ASTM D7624 >20 9.3 8.1 5.9   Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.0   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.1mm *ASTM D7414 >25 20.2 18.0 15.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 >0.1	67 1 76 4 483 1806 893 1183 2798 current 11 7 2 NEG	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG	131 <1 63 5 410 1772 1017 1254 3134 history2 10 8 3 3 NEG
Sulfation Abs/.1mm *ASTM D7415 >30 21.3 20.3 19.0   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.1mm *ASTM D7414 >25 20.2 18.0 15.1	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 <b>limit/base</b> >25 >158 >20 >0.1	67 1 76 4 483 1806 893 1183 2798 current 11 7 2 NEG current	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG history1	131 <1 63 5 410 1772 1017 1254 3134 history2 10 8 3 3 NEG history2
Oxidation Abs/.1mm *ASTM D7414 >25 20.2 18.0 15.1	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 <b>limit/base</b> >25 >158 >20 >0.1	67 1 76 4 483 1806 893 1183 2798 current 11 7 2 NEG current 0.2	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG history1 0.1	131 <131 63 5 410 1772 1017 1254 3134 history2 10 8 3 3 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	250 10 100 450 3000 1150 1350 4250 20 >25 >158 >20 >0.1 imit/base >20	67 1 76 4 483 1806 893 1183 2798 Current 11 7 2 NEG 0.2 9.3	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG history1 0.1 8.1	131 <131 63 5 410 1772 1017 1254 3134 history2 10 8 3 3 NEG NEG history2 0.1 5.9
Base Number (BN) mg KOH/g ASTM D2896 8.5 8.35 8.86 9.33	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 <b>Imit/base</b> >25 >158 >20 >0.1 <b>Imit/base</b> >20 >0.1	67 1 76 4 483 1806 893 1183 2798 <u>current</u> 11 7 2 NEG <u>current</u> 0.2 9.3 21.3	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG history1 0.1 8.1 20.3	131 <131 63 5 410 1772 1017 1254 3134 <b>history2</b> 10 8 3 3 NEG <b>history2</b> 0.1 5.9 19.0
	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 *ASTM D7844 *ASTM D7844 *ASTM D7415	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 >0.1 <b>imit/base</b> >20 >0.1	67 1 76 4 483 1806 893 1183 2798 Current 11 7 2 NEG 0.2 9.3 21.3 Current	93 0 74 4 468 1837 961 1218 3337 history1 11 7 <1 NEG history1 0.1 8.1 20.3 history1	131 <131 63 5 410 1772 1017 1254 3134 <b>history2</b> 10 8 3 3 NEG <b>history2</b> 0.1 5.9 19.0

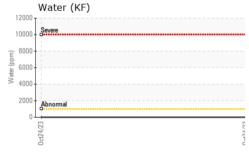


# **OIL ANALYSIS REPORT**



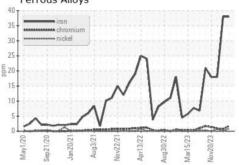


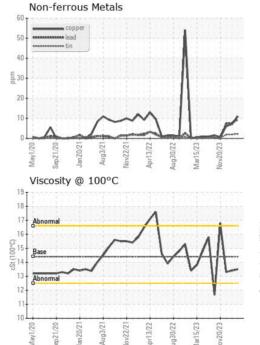


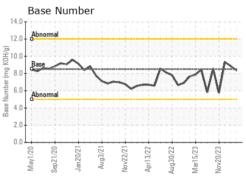


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.5	13.4	13.3
GRAPHS						

Ferrous Alloys







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. Sample No. : WC0859756 Received : 16 May 2024 101 12TH ST Lab Number : 06181558 Tested : 20 May 2024 CATLETTSBURG, KY Unique Number : 11032884 Diagnosed : 20 May 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:

Mar15/23

Jan 20/21

Aug3/2

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) Report Id: MARCAT [WUSCAR] 06181558 (Generated: 05/20/2024 10:45:37) Rev: 1

Mav1/20 Sep21/20

Submitted By: M/V KENOVA

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