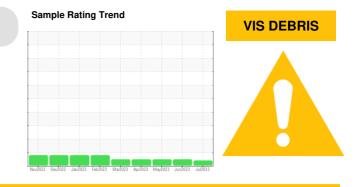


PROBLEM SUMMARY

Area West Virginia [West Virginia] Oil - Starboard Main Engine

Starboard Main Engine Fluid MARATHON 15W40 (150 GAL)

COMPONENT CONDITION SUMMARY



No relevant graphs to display

RECOMMENDATION

Resample at the next service interval to monitor. (Customer Sample Comment: Thurman Richardson)

PROBLEMATIC TEST RESULTS							
Sample Status				ABNORMAL	NORMAL	NORMAL	
Debris	scalar	*Visual	NONE	A MODER	NONE	NONE	

Customer Id: MARCAT Sample No.: WC0735348 Lab Number: 05900175 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Angela Borella +1 800-237-1369 angela.borella@wearcheckusa.com

To change component or sample information: Customer Service +1 1-800-237-1369 <u>customerservice@wearcheck.com</u>

RECOMMENDED ACTIONS

There are no recommended actions for this sample.

HISTORICAL DIAGNOSIS

12 Jun 2023 Diag: Wes Davis





Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

15 May 2023 Diag: Don Baldridge





Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

16 Apr 2023 Diag: Wes Davis



Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



view report

view report





OIL ANALYSIS REPORT

Area West Virginia [West Virginia] Oil - Starboard Main Engine

Starboard Main Engine

MARATHON 15W40 (150 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: Thurman Richardson)

Wear

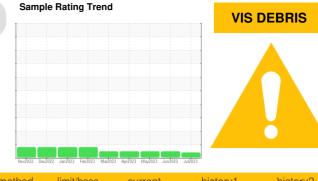
All component wear rates are normal.

Contamination

Moderate concentration of visible dirt/debris present 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 Number Client Info WC0735348 WC0769153 WC073549 Sample Date Client Info 10 Jul 2023 15 Jun 2023 15 May 2023 Machine Age hrs Client Info 36950 36470 0 Oil Age hrs Client Info Savale 1721 1195 Oil Changed Client Info N/A Not Change N/A Sample Status Imitote Current history1 Nickor Glycol WC Method >4.0 <1.0 1.0 NCB Glycol WC Method >4.0 <1.0 NEG NEG WEAR METALS method Imit/base current history1 nistory2 Iron ppm ASTM D51655 >2 0 0 0 Nickel ppm ASTM D51655 >2 0 0 0 Silver ppm ASTM D51655 >16 2 2 1 Copper ppm ASTM D51655 >16 2 2 1 Cadmium ppm ASTM D51655 >16 1 1 1 Nade ppm ASTM D51655 >16 1 1 1 Ca	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 36950 36470 0 Oil Age hrs Client Info 324 1721 1196 Oil Changed Client Info N/A Not Changd N/A Sample Status Imathematical Client Info N/A Not Changd NORMAL CONTAMINATION method Imil/base current history1 history2 Fuel WC Method >4.0 <1.0	Sample Number		Client Info		WC0735348	WC0769153	WC0735469
Oil Age Ins Client Info 324 1721 1196 Oil Changed Client Info N/A Not Changd N/A Sample Status Imit Dass current history1 NoRMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method >4.0 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 4 8 6 Chromium ppm ASTM D5185m >8 0 <1 1 0 Silver ppm ASTM D5185m >2 0 0 0 1 1 0 Copper ppm ASTM D5185m >14 0 <1 <1 1 1 Copper ppm ASTM D5185m S0 0 <th>Sample Date</th> <th></th> <th>Client Info</th> <th></th> <th>10 Jul 2023</th> <th>12 Jun 2023</th> <th>15 May 2023</th>	Sample Date		Client Info		10 Jul 2023	12 Jun 2023	15 May 2023
Oli Changed Sample StatusClient InfoNVA ABNORMALNot Changd NORMALN/A NORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2FuelWC Method>4.0<1.0	Machine Age	hrs	Client Info		36950	36470	0
Sample Status Image Method ABNORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0	Oil Age	hrs	Client Info		324	1721	1196
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0	Oil Changed		Client Info		N/A	Not Changd	N/A
Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >8 0 <1 <1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 0 0 0 Lead ppm ASTM D5185m >18 <1 2 0 0 Vanadium ppm ASTM D5185m >14 0 <1 1 Vanadium ppm ASTM D5185m 14 0 0 0 0 Vanadium ppm ASTM D5185m 119 124 117 Managene ppm ASTM D5185m 662 666 666<	Sample Status				ABNORMAL	NORMAL	NORMAL
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 4 8 6 Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >3 0 <11 0 Lead ppm ASTM D5185m >14 0 <1 <1 Vanadium ppm ASTM D5185m <14 <1 <1 0 Vanadium ppm ASTM D5185m <0 0 0 11 Vanadium ppm ASTM D5185m <11 <1 <1 <1 Vanadium ppm ASTM D5185m <0 0 0 11	CONTAMINATION	V	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 4 8 6 Chromium ppm ASTM D5185m >8 0 <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Iron ppm ASTM D5185m >75 4 8 6 Chromium ppm ASTM D5185m >8 0 <1 <1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 0 Lead ppm ASTM D5185m >18 <1 2 <1 Copper ppm ASTM D5185m >18 <1 <1 <1 <1 Vanadium ppm ASTM D5185m >18 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 1 <1 <1 1 <th>Glycol</th> <th></th> <th>WC Method</th> <th></th> <th>NEG</th> <th>NEG</th> <th>NEG</th>	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >8 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 0 0 Titanium ppm ASTM D5185m >3 0 <1	Iron	ppm	ASTM D5185m	>75	4	8	6
Titanium ppm ASTM D5185m >3 0 <1 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 0 Lead ppm ASTM D5185m >18 <1	Chromium		ASTM D5185m	>8	0	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 0 Lead ppm ASTM D5185m >18 <1 2 <1 Copper ppm ASTM D5185m >80 14 56 54 Tin ppm ASTM D5185m >14 0 <1 <1 Vanadium ppm ASTM D5185m >14 0 <1 <1 Vanadium ppm ASTM D5185m >14 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Nickel	ppm	ASTM D5185m	>2	0	0	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 0 Lead ppm ASTM D5185m >18 <1 2 <1 Copper ppm ASTM D5185m >80 14 0 <1 <1 Vanadium ppm ASTM D5185m >14 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Titanium		ASTM D5185m	>3	0	<1	0
Lead ppm ASTM D5185m >18 <1 2 <1 Copper ppm ASTM D5185m >80 14 56 54 Tin ppm ASTM D5185m >14 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >80 14 56 54 Tin ppm ASTM D5185m >14 0 <1	Aluminum	ppm	ASTM D5185m	>15	2	2	0
Tin ppm ASTM D5185m >14 0 <1 <1 Vanadium ppm ASTM D5185m <1	Lead	ppm	ASTM D5185m	>18	<1	2	<1
Vanadium ppm ASTM D5185m <1 <1 <1 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 301 306 291 Barium ppm ASTM D5185m 0 0 11 Molybdenum ppm ASTM D5185m 119 124 117 Magnese ppm ASTM D5185m 682 686 606 Calcium ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 1 1 1 Potassium ppm <t< td=""><td>Copper</td><td>ppm</td><td>ASTM D5185m</td><td>>80</td><th>14</th><td>56</td><td>54</td></t<>	Copper	ppm	ASTM D5185m	>80	14	56	54
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 301 306 291 Barium ppm ASTM D5185m 0 0 11 Molybdenum ppm ASTM D5185m 0 0 11 Magnese ppm ASTM D5185m 119 124 117 Magnesium ppm ASTM D5185m 682 686 606 Calcium ppm ASTM D5185m 684 696 622 Zinc ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 <1	Tin	ppm	ASTM D5185m	>14	0	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 301 306 291 Barium ppm ASTM D5185m 0 0 11 Molybdenum ppm ASTM D5185m 119 124 117 Magnesium ppm ASTM D5185m <1	Vanadium	ppm	ASTM D5185m		<1	<1	0
Boron ppm ASTM D5185m 301 306 291 Barium ppm ASTM D5185m 0 0 11 Molybdenum ppm ASTM D5185m 119 124 117 Manganese ppm ASTM D5185m <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 11 Molybdenum ppm ASTM D5185m 119 124 117 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 682 686 606 Calcium ppm ASTM D5185m 682 686 606 Calcium ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 866 861 723 Sulfur ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current							
Molybdenum ppm ASTM D5185m 119 124 117 Manganese ppm ASTM D5185m <1	ADDITIVES		method	limit/base	current	history1	history2
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 682 686 606 Calcium ppm ASTM D5185m 1602 1683 1406 Phosphorus ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 866 861 723 Sulfur ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 <1		ppm		limit/base			
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Phosphorus ppm ASTM D5185m 694 696 622 Zinc ppm ASTM D5185m 866 861 723 Sulfur ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >20 4 0 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 6.4 8.7 7.7 Sulfation Abs/1mm *ASTM D7415 >30 23.6 24.6	Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	301 0 119	306 0 124	291 11 117
Zinc ppm ASTM D5185m 866 861 723 Sulfur ppm ASTM D5185m 3055 3033 2362 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >75 0 1 1 Potassium ppm ASTM D5185m >20 <1	Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	301 0 119 <1	306 0 124 <1	291 11 117 <1
SulfurppmASTM D5185m305530332362CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20455SodiumppmASTM D5185m>75011PotassiumppmASTM D5185m>20<1	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	301 0 119 <1 682	306 0 124 <1 686	291 11 117 <1 606
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20455SodiumppmASTM D5185m>75011PotassiumppmASTM D5185m>20<1	Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	301 0 119 <1 682 1602	306 0 124 <1 686 1683	291 11 117 <1 606 1406
Silicon ppm ASTM D5185m >20 4 5 5 Sodium ppm ASTM D5185m >75 0 1 1 Potassium ppm ASTM D5185m >75 0 1 1 Potassium ppm ASTM D5185m >20 <1	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	limit/base	301 0 119 <1 682 1602 694	306 0 124 <1 686 1683 696	291 11 117 <1 606 1406 622
Sodium ppm ASTM D5185m >75 0 1 1 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 6.4 8.7 7.7 Sulfation Abs/.1mm *ASTM D7415 >30 23.6 24.6 24.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	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	limit/base	301 0 119 <1 682 1602 694 866	306 0 124 <1 686 1683 696 861	291 11 117 <1 606 1406 622 723
Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 6.4 8.7 7.7 Sulfation Abs/.1mm *ASTM D7415 >30 23.6 24.6 24.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	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		301 0 119 <1 682 1602 694 866 3055	306 0 124 <1 686 1683 696 861 3033	291 11 117 <1 606 1406 622 723 2362
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D78440.20.20.2NitrationAbs/cm*ASTM D7624>206.48.77.7SulfationAbs/.1mm*ASTM D7415>3023.624.624.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2516.418.418.2	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	301 0 119 <1 682 1602 694 866 3055 current	306 0 124 <1 686 1683 696 861 3033 history1	291 11 117 <1 606 1406 622 723 2362 history2
Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 6.4 8.7 7.7 Sulfation Abs/.1mm *ASTM D7415 >30 23.6 24.6 24.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	Boron Barium Molybdenum Maganese 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 ASTM D5185m	limit/base >20	301 0 119 <1 682 1602 694 866 3055 current 4	306 0 124 <1 686 1683 696 861 3033 history1 5	291 11 117 <1 606 1406 622 723 2362 history2 5
Nitration Abs/cm *ASTM D7624 >20 6.4 8.7 7.7 Sulfation Abs/.1mm *ASTM D7415 >30 23.6 24.6 24.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	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	301 0 119 <1 682 1602 694 866 3055 <u>current</u> 4 0	306 0 124 <1 686 1683 696 861 3033 history1 5 1	291 11 117 <1 606 1406 622 723 2362 history2 5 1
Sulfation Abs/.1mm *ASTM D7415 >30 23.6 24.6 24.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	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	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0 0	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0 0 history2
Oxidation Abs/.1mm *ASTM D7414 >25 16.4 18.4 18.2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20 limit/base	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1 current 0.2	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0 0 history1 0.2	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0 0 history2 0.2
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20 limit/base	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1 current 0.2 6.4	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0 history1 0.2 8.7	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0 0 history2 0.2 7.7
Base Number (BN) mg KOH/g ASTM D2896 9.26 10.58	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >20 >75 >20 limit/base ≥20 s30	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1 current 0.2 6.4 23.6	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0 0 history1 0.2 8.7 24.6	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0 history2 0.2 7.7 24.8
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	limit/base >20 >75 >20 limit/base >20 >30 limit/base	301 0 119 <1 682 1602 694 866 3055 current 4 0 <1 current 0.2 6.4 23.6 current	306 0 124 <1 686 1683 696 861 3033 history1 5 1 0 0 history1 0.2 8.7 24.6 history1	291 11 117 <1 606 1406 622 723 2362 history2 5 1 0 0 history2 0.2 7.7 24.8 history2



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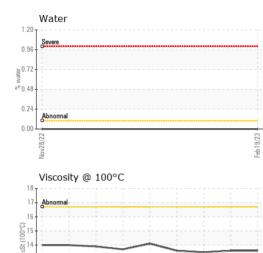
Nov28/22

Jec24/22

Water

an18/73

OIL ANALYSIS REPORT

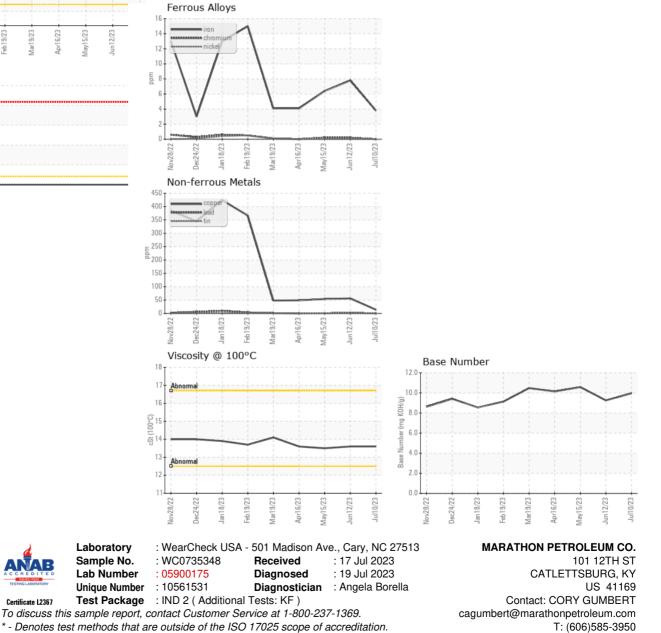


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Mar19/23

eh19/23

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	🔺 MODER	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		13.6	13.6	13.5
GRAPHS						



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



Report Id: MARCAT [WUSCAR] 05900175 (Generated: 07/19/2023 13:09:22) Rev: 1

Certificate L2367

Submitted By: M/V WEST VIRGINIA

F: x: