

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Huntington [Huntington] Oil - Starboard Main Engine

Starboard Main Engine

DIESEL ENGINE OIL SAE 15W40 (165 GAL)

DIAGNOSIS

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

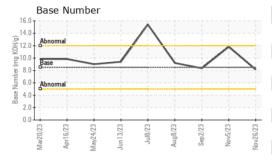
Fluid Condition

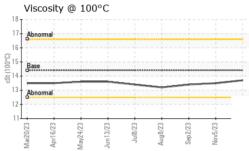
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION							
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 18875 18484 17511 Oil Age hrs Client Info 0 1043 0 Oil Changed Client Info Not Changd Oil Added Oil Added Sample Status method limit/base current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG Iron ppm ASTM D5185m >75 8 8 7 Chromium ppm ASTM D5185m >8 0 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 <1 Lead ppm AST	Sample Number		Client Info		WC0804875	WC0804879	WC0735506
Oil Age	Sample Date		Client Info		26 Nov 2023	05 Nov 2023	02 Sep 2023
Oil Changed Sample Status Client Info Not Changd NORMAL Oil Added NORMAL Oil Added NORMAL Oil Added NORMAL Added NORMAL NORMAL </th <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>18875</th> <th>18484</th> <th>17511</th>	Machine Age	hrs	Client Info		18875	18484	17511
Oil Changed Sample Status Client Info Not Changd NORMAL Oil Added NORMAL Oil Added NORMAL Oil Added NORMAL Added NORMAL NORMAL </th <th>Oil Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>0</th> <th>1043</th> <th>0</th>	Oil Age	hrs	Client Info		0	1043	0
Sample Status	-		Client Info		Not Changd	Oil Added	Oil Added
Fuel	Sample Status					NORMAL	NORMAL
WEAR METALS	CONTAMINATION	٧	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 8 8 7 Chromium ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Titanium ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 <1 Lead ppm ASTM D5185m >18 6 4 4 Copper ppm ASTM D5185m >80 10 6 7 Tin ppm ASTM D5185m >14 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >8 0 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Titanium ppm ASTM D5185m >3 0 0 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 <1 Lead ppm ASTM D5185m >80 10 6 7 Tin ppm ASTM D5185m >80 10 6 7 Tin ppm ASTM D5185m >14 <1 <1 <1 Vanadium ppm ASTM D5185m >10 0 <1 <1 Cadmium ppm ASTM D5185m >10 0 <1 <1 Boron ppm ASTM D5185m 10 0 0 <1 <1 Boron ppm ASTM D5185m 10 0 0	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>75	8	8	7
Titanium	Chromium	ppm	ASTM D5185m	>8	0	0	0
Titanium	Nickel		ASTM D5185m	>2	<1	0	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >15 2 2 <1	Titanium			>3	0		<1
Aluminum ppm ASTM D5185m >15 2 2 <1							
Lead ppm ASTM D5185m >18 6 4 4 Copper ppm ASTM D5185m >80 10 6 7 Tin ppm ASTM D5185m >14 <1							
Copper ppm ASTM D5185m >80 10 6 7 Tin ppm ASTM D5185m >14 <1 <1 <1 Vanadium ppm ASTM D5185m <1 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 94 105 138 Barium ppm ASTM D5185m 100 0 0 0 Molybdenum ppm ASTM D5185m 100 78 84 88 Manganese ppm ASTM D5185m 100 78 84 88 Magnesium ppm ASTM D5185m 100 <1 <1 <1 Magnesium ppm ASTM D5185m 450 849 764 753 Calcium ppm ASTM D5185m 1150 827 736 79							
Tin ppm ASTM D5185m >14 <1							
Vanadium ppm ASTM D5185m <1					-		
Cadmium ppm ASTM D5185m 0 0 <1				>14			
ADDITIVES							
Boron	Cadmium	ppm	ASTM D5185m		U	0	<1
Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 100 78 84 88 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 450 849 764 753 Calcium ppm ASTM D5185m 3000 1439 1401 1574 Phosphorus ppm ASTM D5185m 3000 1439 1401 1574 Phosphorus ppm ASTM D5185m 1150 827 736 792 Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20<	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 100 78 84 88 Manganese ppm ASTM D5185m 0 <1						<u> </u>	•
Manganese ppm ASTM D5185m 0 <1		ppm					
Magnesium ppm ASTM D5185m 450 849 764 753 Calcium ppm ASTM D5185m 3000 1439 1401 1574 Phosphorus ppm ASTM D5185m 1150 827 736 792 Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844	Boron		ASTM D5185m	250	94	105	138
Calcium ppm ASTM D5185m 3000 1439 1401 1574 Phosphorus ppm ASTM D5185m 1150 827 736 792 Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7414 <th>Boron Barium</th> <th>ppm</th> <th>ASTM D5185m ASTM D5185m</th> <th>250 10</th> <th>94 0</th> <th>105 0</th> <th>138 0</th>	Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	94 0	105 0	138 0
Phosphorus ppm ASTM D5185m 1150 827 736 792 Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 <th>Boron Barium Molybdenum</th> <th>ppm ppm</th> <th>ASTM D5185m ASTM D5185m ASTM D5185m</th> <th>250 10</th> <th>94 0 78</th> <th>105 0 84</th> <th>138 0 88</th>	Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	94 0 78	105 0 84	138 0 88
Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D5185m >20 2 0 1 Water % ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/:nm *ASTM D7415 >30	Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	94 0 78 0	105 0 84 <1	138 0 88 <1
Zinc ppm ASTM D5185m 1350 1030 965 1000 Sulfur ppm ASTM D5185m 4250 2623 2692 3309 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	94 0 78 0 849	105 0 84 <1 764	138 0 88 <1 753
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439	105 0 84 <1 764 1401	138 0 88 <1 753 1574
Silicon ppm ASTM D5185m >20 4 3 4 Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG 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 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	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	94 0 78 0 849 1439 827	105 0 84 <1 764 1401 736	138 0 88 <1 753 1574 792
Sodium ppm ASTM D5185m >158 3 2 3 Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439 827 1030	105 0 84 <1 764 1401 736 965	138 0 88 <1 753 1574 792 1000
Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439 827 1030 2623	105 0 84 <1 764 1401 736 965 2692	138 0 88 <1 753 1574 792 1000 3309
Potassium ppm ASTM D5185m >20 2 0 1 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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 ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	94 0 78 0 849 1439 827 1030 2623 current	105 0 84 <1 764 1401 736 965 2692 history1	138 0 88 <1 753 1574 792 1000 3309 history2
Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439 827 1030 2623 current	105 0 84 <1 764 1401 736 965 2692 history1	138 0 88 <1 753 1574 792 1000 3309 history2
Soot % % *ASTM D7844 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158	94 0 78 0 849 1439 827 1030 2623 current 4	105 0 84 <1 764 1401 736 965 2692 history1 3 2	138 0 88 <1 753 1574 792 1000 3309 history2 4
Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439 827 1030 2623 current 4 3	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0	138 0 88 <1 753 1574 792 1000 3309 history2 4 3
Nitration Abs/cm *ASTM D7624 >20 9.7 9.8 9.7 Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG
Sulfation Abs/.1mm *ASTM D7415 >30 22.8 23.0 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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 >0.1	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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 method *ASTM D7844	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG current 0.2	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1 0.2	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG history2 0.2
Oxidation Abs/.1mm *ASTM D7414 >25 19.9 19.9 18.8	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 D7624	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG current 0.2 9.7	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1 0.2 9.8	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG history2 0.2 9.7
	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	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG current 0.2 9.7 22.8	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1 0.2 9.8 23.0	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG history2 0.2 9.7 22.5
Base Number (BN) mg KOH/g ASTM D2896 8.5 8.15 11.83 8.35	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 D7844 *ASTM D7624 *ASTM D7415 method	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1 limit/base	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG current 0.2 9.7 22.8 current	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1 0.2 9.8 23.0 history1	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG history2 0.2 9.7 22.5
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D6304 method *ASTM D7844 *ASTM D7624 *ASTM D7415 method *ASTM D7414	250 10 100 450 3000 1150 1350 4250 limit/base >20 >0.1 limit/base >20 >30 limit/base	94 0 78 0 849 1439 827 1030 2623 current 4 3 2 NEG current 0.2 9.7 22.8 current	105 0 84 <1 764 1401 736 965 2692 history1 3 2 0 NEG history1 0.2 9.8 23.0 history1 19.9	138 0 88 <1 753 1574 792 1000 3309 history2 4 3 1 NEG history2 0.2 9.7 22.5 history2 18.8



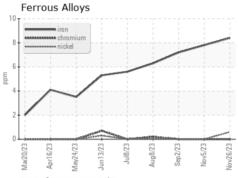
OIL ANALYSIS REPORT

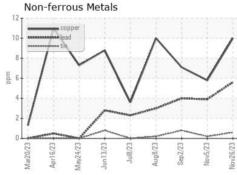


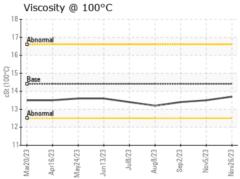


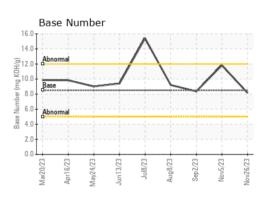
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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				history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.7	13.5	13.4













Certificate L2367

Laboratory Sample No. Lab Number

Unique Number : 10776451

: WC0804875 : 06026660

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

: 06 Dec 2023 : 07 Dec 2023

Diagnostician : Sean Felton

Test Package : IND 2 (Additional Tests: KF)

US 41169 Contact: CORY GUMBERT cagumbert@marathonpetroleum.com

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

T: (606)585-3950 F: x:

101 12TH ST

CATLETTSBURG, KY

MARATHON PETROLEUM CO.