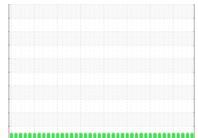


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Detroit [Detroit] Oil - Port Main Engine

Port Main Engine

MOBIL 15W40 (150 GAL)

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal for time on oil.

Contamination

There is no indication of any contamination in the

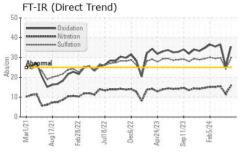
Fluid Condition

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

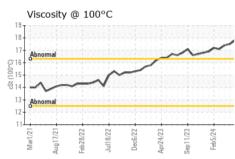
| SAMPLE INFORMATION | CAMPLE INFORM | AATIONI | ام مالم مما | 1::- | | المستعددة المستعددة | histom O |
|--|---|--|--|---|--|--|--|
| Sample Date Client Info 03 Jun 2024 20 May 2024 22 Apr 2024 Machine Age hrs Client Info 12504 22276 11674 Oil Age hrs Client Info 12504 12276 11674 Oil Changed Client Info Not Changd NoRMAL Not Changd NoRMAL N/A NORMAL Sample Status method limit/bass current history1 history2 Fuel WC Method NEG NEG NEG NEG WEAR METALS method limit/bass current history1 history2 Iron ppm ASTM 5618m >4.0 <1.0 | | MATION | | imivoase | | | • |
| Machine Age hrs Client Info 20693 20693 20091 Oil Age hrs Client Info 12504 12276 11674 Oil Changed Client Info Not Changd N/A NORMAL NORMAL CONTAMINATION method limit/bass current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG WEAR METALS method limit/bass current history1 history2 Iron ppm ASTM D5185m >75 66 68 73 Chromium ppm ASTM D5185m >2 1 0 <1 Nickel ppm ASTM D5185m >2 1 0 <1 Aluminum ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >18 24 24 28 Copper <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> | | | | | | | |
| Oil Age hrs Client Info 12504 12276 11674 Oil Changed Client Info Not Changd N/A Sample Status NORMAL NORMAL <th< th=""><th>•</th><th></th><th></th><th></th><th></th><th>,</th><th></th></th<> | • | | | | | , | |
| Contamed Client Info Not Changd Normal Normal | <u> </u> | | | | | | |
| NORMAL NORMAL NORMAL NORMAL | - | hrs | | | | | |
| CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0 <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 >75 66 68 73 Chromium ppm ASTM D5185m >2 1 0 <1 Nickel ppm ASTM D5185m >2 1 0 <1 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >15 3 2 4 Lead ppm ASTM D5185m >18 24 24 28 Copper ppm ASTM D5185m >18 24 24 28 Copper ppm ASTM D5185m 16 15 18 <th></th> <th></th> <th>Client Info</th> <th></th> <th></th> <th>_</th> <th></th> | | | Client Info | | | _ | |
| Fuel | Sample Status | | | | NORMAL | NORMAL | NORMAL |
| WEAR METALS | CONTAMINATION | N | method | limit/base | current | history1 | history2 |
| WEAR METALS method limit/base current history2 Iron ppm ASTM D5185m >75 66 68 73 Chromium ppm ASTM D5185m >8 <1 <1 1 Nickel ppm ASTM D5185m >2 1 0 <1 Titanium ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >18 24 24 28 Copper ppm ASTM D5185m >80 16 15 18 Tin ppm ASTM D5185m >14 <1 1 3 2 Vanadium ppm ASTM D5185m 0 0 <1 1 Cadmium ppm ASTM D5185m 0 0 <1 1 ADDITIVES method limit/base current history1 <t< th=""><th>Fuel</th><th></th><th>WC Method</th><th>>4.0</th><th><1.0</th><th><1.0</th><th><1.0</th></t<> | Fuel | | WC Method | >4.0 | <1.0 | <1.0 | <1.0 |
| Iron | Glycol | | WC Method | | NEG | NEG | NEG |
| Chromium ppm ASTM D5185m >8 <1 | WEAR METALS | | method | limit/base | current | history1 | history2 |
| Nickel | Iron | ppm | ASTM D5185m | >75 | 66 | 68 | 73 |
| Titanium | Chromium | ppm | ASTM D5185m | >8 | <1 | <1 | 1 |
| Stiver | Nickel | ppm | ASTM D5185m | >2 | 1 | 0 | <1 |
| Aluminum ppm ASTM D5185m >15 3 2 4 Lead ppm ASTM D5185m >18 24 24 28 Copper ppm ASTM D5185m >80 16 15 18 Tin ppm ASTM D5185m >14 <1 | Titanium | ppm | ASTM D5185m | >3 | 0 | 0 | <1 |
| Lead | Silver | ppm | ASTM D5185m | >2 | 0 | 0 | <1 |
| Copper ppm ASTM D5185m >80 16 15 18 Tin ppm ASTM D5185m >14 <1 | Aluminum | ppm | ASTM D5185m | >15 | 3 | 2 | 4 |
| Tin ppm ASTM D5185m >14 <1 1 3 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 62 56 74 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 44 47 51 Manganese ppm ASTM D5185m 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 <t< td=""><td>Lead</td><td>ppm</td><td>ASTM D5185m</td><td>>18</td><th>24</th><td>24</td><td>28</td></t<> | Lead | ppm | ASTM D5185m | >18 | 24 | 24 | 28 |
| Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 62 56 74 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 44 47 51 Manganese ppm ASTM D5185m 1 <1 <1 <1 Magnesium ppm ASTM D5185m 712 729 742 Calcium ppm ASTM D5185m 2306 2423 2347 Phosphorus ppm ASTM D5185m 900 912 991 Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 4 | Copper | ppm | ASTM D5185m | >80 | 16 | 15 | 18 |
| Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 62 56 74 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 44 47 51 Manganese ppm ASTM D5185m 1 <1 | Tin | ppm | ASTM D5185m | >14 | <1 | 1 | 3 |
| ADDITIVES | Vanadium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Boron | Cadmium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 44 47 51 Manganese ppm ASTM D5185m 712 729 742 Calcium ppm ASTM D5185m 2306 2423 2347 Phosphorus ppm ASTM D5185m 900 912 991 Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 3 2 5 Water % ASTM D5185m >20 3 2 5 Water % ASTM D5185m | | | | | | | |
| Molybdenum ppm ASTM D5185m 44 47 51 Manganese ppm ASTM D5185m 1 <1 | ADDITIVES | | method | limit/base | current | history1 | history2 |
| Manganese ppm ASTM D5185m 1 <1 | | ppm | | limit/base | | | |
| Magnesium ppm ASTM D5185m 712 729 742 Calcium ppm ASTM D5185m 2306 2423 2347 Phosphorus ppm ASTM D5185m 900 912 991 Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 3 2 5 Water % ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 15.8 11.6 15.5 | Boron | | ASTM D5185m | limit/base | 62 | 56 | 74 |
| Calcium ppm ASTM D5185m 2306 2423 2347 Phosphorus ppm ASTM D5185m 900 912 991 Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 3 2 5 Water ppm ASTM D5185m >20 3 2 5 Water % ASTM D5185m >1 NEG NEG NEG INFRA-R | Boron Barium | ppm | ASTM D5185m ASTM D5185m | limit/base | 62 0 | 56 0 | 74 0 |
| Phosphorus ppm ASTM D5185m 900 912 991 Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >118 7 6 4 Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 | Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 62 0 44 | 56 0 47 | 74 0 51 |
| Zinc ppm ASTM D5185m 1104 1111 1133 Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >20 3 2 5 Vater % ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 | Boron Barium Molybdenum Manganese | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 62 0 44 1 | 56 0 47 <1 | 74 0 51 <1 |
| Sulfur ppm ASTM D5185m 4192 4220 3711 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >118 7 6 4 Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % "ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm "ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm "ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm "ASTM D7414 >25 35.5< | Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 62 0 44 1 712 | 56 0 47 <1 729 | 74 0 51 <1 742 |
| CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >118 7 6 4 Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 62 0 44 1 712 2306 | 56 0 47 <1 729 2423 | 74 0 51 <1 742 2347 |
| Silicon ppm ASTM D5185m >20 4 4 6 Sodium ppm ASTM D5185m >118 7 6 4 Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | 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 ASTM D5185m | limit/base | 62 0 44 1 712 2306 900 | 56 0 47 <1 729 2423 912 | 74 0 51 <1 742 2347 991 |
| Sodium ppm ASTM D5185m >118 7 6 4 Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | 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 | limit/base | 62 0 44 1 712 2306 900 1104 | 56 0 47 <1 729 2423 912 1111 | 74 0 51 <1 742 2347 991 1133 |
| Potassium ppm ASTM D5185m >20 3 2 5 Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | 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 | | 62 0 44 1 712 2306 900 1104 4192 | 56 0 47 <1 729 2423 912 1111 4220 | 74 0 51 <1 742 2347 991 1133 3711 |
| Water % ASTM D6304 >0.1 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | limit/base | 62 0 44 1 712 2306 900 1104 4192 current | 56 0 47 <1 729 2423 912 1111 4220 history1 | 74 0 51 <1 742 2347 991 1133 3711 history2 |
| INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | limit/base | 62 0 44 1 712 2306 900 1104 4192 current | 56 0 47 <1 729 2423 912 1111 4220 history1 | 74 0 51 <1 742 2347 991 1133 3711 history2 |
| Soot % % *ASTM D7844 0.5 0.3 0.5 Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium | ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | limit/base >20 >118 | 62 0 44 1 712 2306 900 1104 4192 current 4 | 56 0 47 <1 729 2423 912 1111 4220 history1 4 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 |
| Nitration Abs/cm *ASTM D7624 >20 15.8 11.6 15.5 Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m | limit/base >20 >118 >20 | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 |
| Sulfation Abs/.1mm *ASTM D7415 >30 29.6 24.3 29.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | 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 | limit/base >20 >118 >20 >0.1 | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG |
| FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 35.5 25.4 36.6 | 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 | limit/base >20 >118 >20 >0.1 | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG history1 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG history2 |
| Oxidation | 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 | limit/base >20 >118 >20 >0.1 limit/base | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG current 0.5 | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG history1 0.3 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG history2 0.5 |
| | 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 | limit/base >20 >118 >20 >0.1 limit/base | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG current 0.5 15.8 | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG history1 0.3 11.6 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG history2 0.5 15.5 |
| | 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 | limit/base >20 >118 >20 >0.1 limit/base >20 >0.3 | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG current 0.5 15.8 29.6 | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG history1 0.3 11.6 24.3 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG history2 0.5 15.5 29.9 |
| | 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 D7844 *ASTM D7624 *ASTM D7415 method | limit/base >20 >118 >20 >0.1 limit/base >20 >0.1 limit/base | 62 0 44 1 712 2306 900 1104 4192 current 4 7 3 NEG current 0.5 15.8 29.6 current | 56 0 47 <1 729 2423 912 1111 4220 history1 4 6 2 NEG history1 0.3 11.6 24.3 history1 | 74 0 51 <1 742 2347 991 1133 3711 history2 6 4 5 NEG history2 0.5 15.5 29.9 history2 |

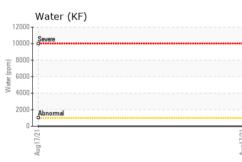


OIL ANALYSIS REPORT



| Water (| (KF) | | |
|------------------|------|------|----------|
| 10000 - Severe | | | |
| € 8000 | | | |
| Mater (ppm) 6000 | | | |
| ≥ 4000 | | | |
| Abnormal | | | |
| 12/71 | | | Aug17/21 |
| Augl | | | Aug |

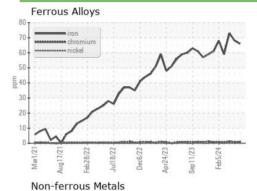


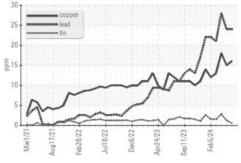


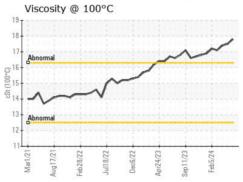
| VISUAL | | method | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Precipitate | 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 |

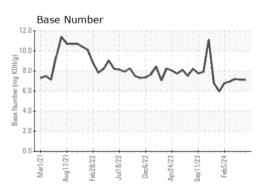
| FLUID PROPERTIES | | method | | | | history2 | |
|------------------|-----|-----------|--|------|------|----------|--|
| Visc @ 100°C | cSt | ASTM D445 | | 17.8 | 17.5 | 17.4 | |

GRAPHS













Certificate 12367

Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0859862 Lab Number : 06219913 Unique Number : 11098110

Test Package : IND 2 (Additional Tests: KF)

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

Received **Tested** Diagnosed

: 25 Jun 2024 : 26 Jun 2024 : 26 Jun 2024 - Sean Felton

MARATHON PETROLEUM CO. 101 12TH ST CATLETTSBURG, KY US 41169

Contact: CORY GUMBERT cagumbert@marathonpetroleum.com

* - 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)

Submitted By: M/V DETROIT

T: (606)585-3950

F: x: