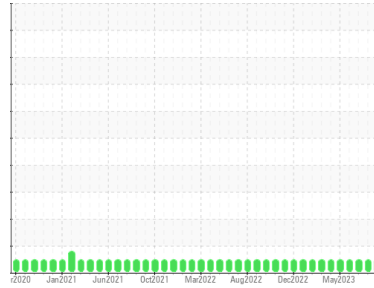




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
Paul G. Blazer
 Machine Id
[Paul G. Blazer] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
DIESEL ENGINE OIL SAE 15W40 (150 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

| method | limit/base | current | history1 | history2 | |
|---------------|-------------|--------------------|--------------|-------------|-------|
| Sample Number | Client Info | WC0621769 | WC0621767 | WC0719296 | |
| Sample Date | Client Info | 04 Oct 2023 | 31 Aug 2023 | 07 Aug 2023 | |
| Machine Age | hrs | Client Info | 69363 | 68653 | 68149 |
| Oil Age | hrs | Client Info | 2123 | 1413 | 909 |
| Oil Changed | Client Info | N/A | Not Changd | N/A | |
| Sample Status | | NORMAL | NORMAL | NORMAL | |

CONTAMINATION

| 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 ASTM D5185m >75 | 9 | 7 | 5 |
| Chromium | ppm ASTM D5185m >8 | <1 | 0 | <1 |
| Nickel | ppm ASTM D5185m >2 | <1 | 0 | <1 |
| Titanium | ppm ASTM D5185m >3 | 0 | <1 | <1 |
| Silver | ppm ASTM D5185m >2 | 0 | 0 | <1 |
| Aluminum | ppm ASTM D5185m >15 | 6 | <1 | 1 |
| Lead | ppm ASTM D5185m >18 | <1 | <1 | 3 |
| Copper | ppm ASTM D5185m >80 | <1 | <1 | 4 |
| Tin | ppm ASTM D5185m >14 | <1 | <1 | <1 |
| Vanadium | ppm ASTM D5185m | 0 | <1 | <1 |
| Cadmium | ppm ASTM D5185m | 0 | <1 | 0 |

ADDITIVES

| method | limit/base | current | history1 | history2 |
|------------|----------------------|--------------|----------|----------|
| Boron | ppm ASTM D5185m 250 | 94 | 135 | 150 |
| Barium | ppm ASTM D5185m 10 | 0 | 0 | 0 |
| Molybdenum | ppm ASTM D5185m 100 | 73 | 73 | 70 |
| Manganese | ppm ASTM D5185m | <1 | <1 | 2 |
| Magnesium | ppm ASTM D5185m 450 | 985 | 955 | 768 |
| Calcium | ppm ASTM D5185m 3000 | 1374 | 1639 | 1420 |
| Phosphorus | ppm ASTM D5185m 1150 | 796 | 765 | 691 |
| Zinc | ppm ASTM D5185m 1350 | 1012 | 947 | 851 |
| Sulfur | ppm ASTM D5185m 4250 | 3256 | 3438 | 3323 |

CONTAMINANTS

| method | limit/base | current | history1 | history2 |
|-----------|----------------------|----------|----------|----------|
| Silicon | ppm ASTM D5185m >20 | 3 | 3 | 4 |
| Sodium | ppm ASTM D5185m >158 | 1 | <1 | 5 |
| Potassium | ppm ASTM D5185m >20 | 1 | 1 | 3 |

INFRA-RED

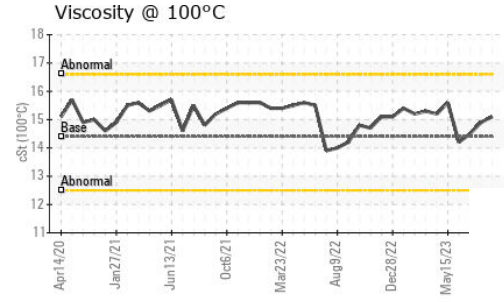
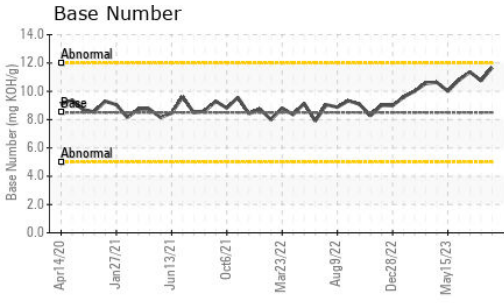
| method | limit/base | current | history1 | history2 |
|-----------|--------------------------|-------------|----------|----------|
| Soot % | % *ASTM D7844 | 1.7 | 1.1 | 0.8 |
| Nitration | Abs/cm *ASTM D7624 >20 | 8.1 | 7.9 | 7.0 |
| Sulfation | Abs/.1mm *ASTM D7415 >30 | 21.9 | 22.2 | 21.6 |

FLUID DEGRADATION

| method | limit/base | current | history1 | history2 |
|------------------|--------------------------|--------------|----------|----------|
| Oxidation | Abs/.1mm *ASTM D7414 >25 | 15.4 | 16.2 | 15.9 |
| Base Number (BN) | mg KOH/g ASTM D2896 8.5 | 11.67 | 10.75 | 11.37 |



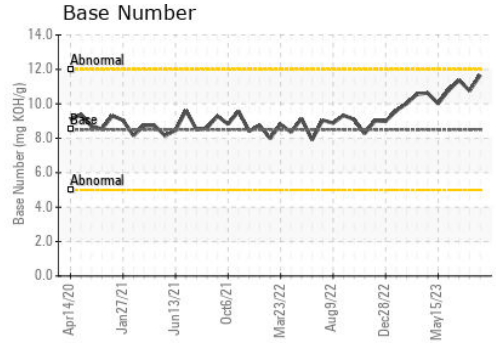
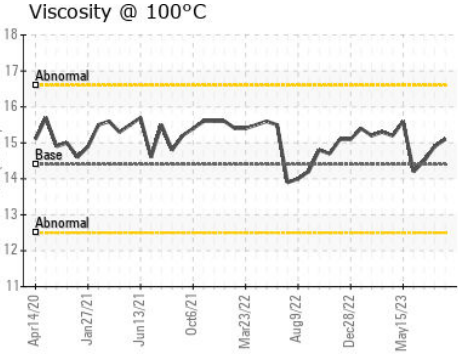
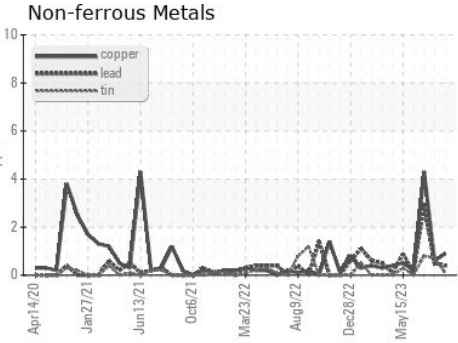
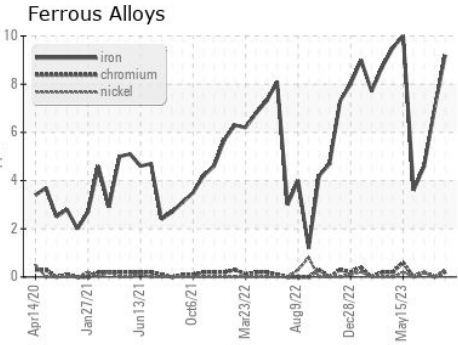
OIL ANALYSIS REPORT



| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | NONE | NONE |
| Silt | scalar | *Visual | NONE | NONE | NONE |
| Debris | scalar | *Visual | NONE | NONE | NONE |
| Sand/Dirt | scalar | *Visual | NONE | NONE | NONE |
| Appearance | scalar | *Visual | NORML | NORML | NORML |
| Odor | scalar | *Visual | NORML | NORML | NORML |
| Emulsified Water | scalar | *Visual | >0.1 | NEG | NEG |
| Free Water | scalar | *Visual | | NEG | NEG |

| FLUID PROPERTIES | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 15.1 | 14.9 |

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0621769 **Received** : 13 Oct 2023
Lab Number : 05978421 **Diagnosed** : 17 Oct 2023
Unique Number : 10695716 **Diagnostician** : Angela Borella
Test Package : IND 2 (Additional Tests: KF)

MARATHON PETROLEUM CO.
 101 12TH ST
 CATLETTSBURG, KY
 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: