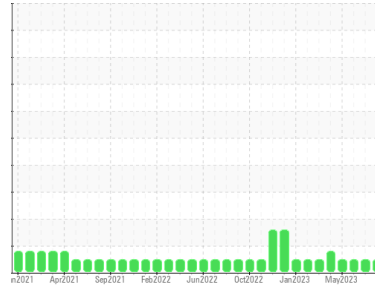




OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Area

Detroit

Machine Id

[Detroit] Oil - Starboard Reduction Gear

Component

Starboard Reduction Gear

Fluid

MARATHON 30W (35 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: Chris wray)

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

SAMPLE INFORMATION

| | method | limit/base | current | history1 | history2 |
|---------------|-------------|-------------|--------------------|-------------|-------------|
| Sample Number | Client Info | | WC0769394 | WC0769390 | WC0735794 |
| Sample Date | Client Info | | 14 Aug 2023 | 17 Jul 2023 | 19 Jun 2023 |
| Machine Age | hrs | Client Info | 24295 | 23846 | 23377 |
| Oil Age | hrs | Client Info | 4493 | 4044 | 3569 |
| Oil Changed | Client Info | | Not Changed | Not Changed | Not Changed |
| Sample Status | | | NORMAL | NORMAL | NORMAL |

WEAR METALS

| | method | limit/base | current | history1 | history2 |
|----------|--------|------------------|--------------|----------|----------|
| Iron | ppm | ASTM D5185m >150 | 32 | 31 | 31 |
| Chromium | ppm | ASTM D5185m >10 | 0 | 0 | <1 |
| Nickel | ppm | ASTM D5185m >10 | 0 | 0 | <1 |
| Titanium | ppm | ASTM D5185m | 0 | <1 | 0 |
| Silver | ppm | ASTM D5185m | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m >25 | <1 | <1 | <1 |
| Lead | ppm | ASTM D5185m >100 | <1 | 0 | <1 |
| Copper | ppm | ASTM D5185m >50 | 57 | 53 | 50 |
| Tin | ppm | ASTM D5185m >10 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | <1 | <1 | 0 |
| Cadmium | ppm | ASTM D5185m | 0 | 0 | 0 |

ADDITIVES

| | method | limit/base | current | history1 | history2 |
|------------|--------|-------------|--------------|----------|----------|
| Boron | ppm | ASTM D5185m | 30 | 35 | 32 |
| Barium | ppm | ASTM D5185m | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 13 | 14 | 14 |
| Manganese | ppm | ASTM D5185m | <1 | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 223 | 233 | 223 |
| Calcium | ppm | ASTM D5185m | 3051 | 3248 | 3133 |
| Phosphorus | ppm | ASTM D5185m | 888 | 980 | 951 |
| Zinc | ppm | ASTM D5185m | 1047 | 1091 | 1086 |
| Sulfur | ppm | ASTM D5185m | 7795 | 8559 | 7570 |

CONTAMINANTS

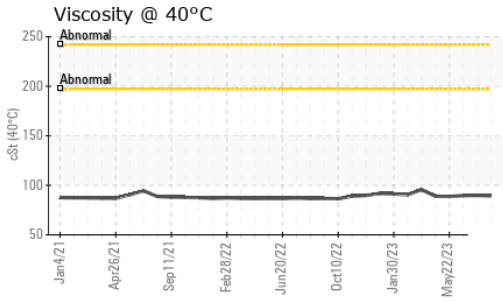
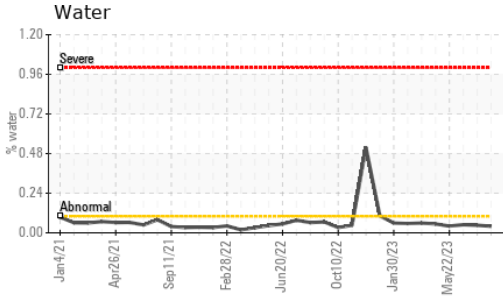
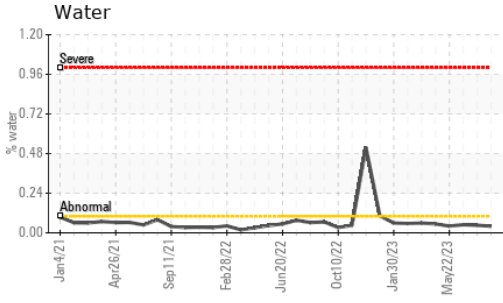
| | method | limit/base | current | history1 | history2 |
|-----------|--------|------------------|--------------|----------|----------|
| Silicon | ppm | ASTM D5185m >50 | 4 | 4 | 5 |
| Sodium | ppm | ASTM D5185m | <1 | 3 | <1 |
| Potassium | ppm | ASTM D5185m >20 | 0 | 0 | 1 |
| Water | % | ASTM D6304 >0.1 | 0.040 | 0.046 | 0.049 |
| ppm Water | ppm | ASTM D6304 >1000 | 402.2 | 468.3 | 494.4 |

FLUID DEGRADATION

| | method | limit/base | current | history1 | history2 |
|------------------|----------|------------|-------------|----------|----------|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 0.89 | 1.01 | 1.08 |



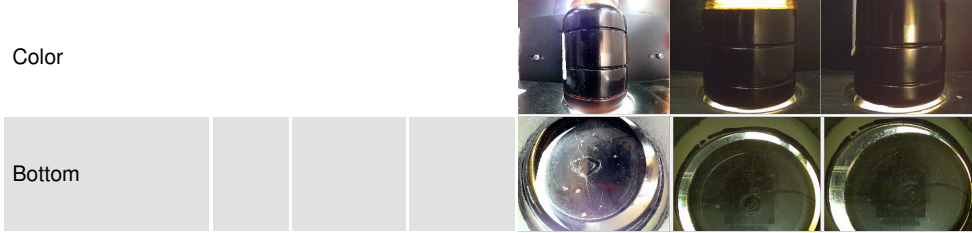
OIL ANALYSIS REPORT



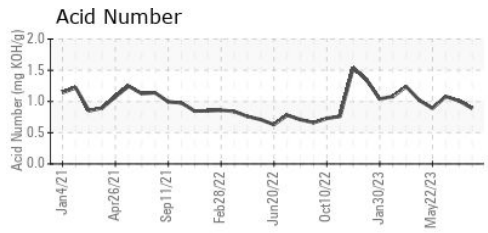
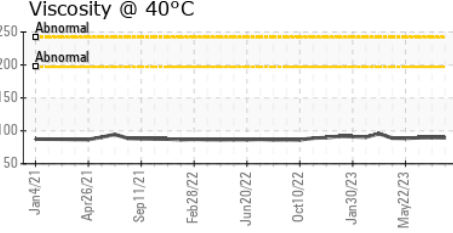
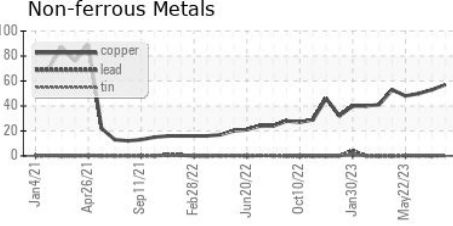
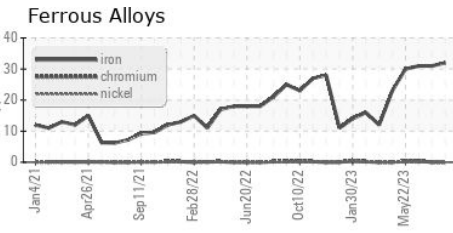
| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | NONE | NONE |
| Silt | scalar | *Visual | NONE | NONE | NONE |
| Debris | scalar | *Visual | NONE | NONE | LIGHT |
| 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 @ 40°C | cSt | ASTM D445 | 89.4 | 89.8 | 89.6 |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---------------|--------|------------|---------|----------|----------|
|---------------|--------|------------|---------|----------|----------|



GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0769394 **Received** : 23 Aug 2023
Lab Number : 05932147 **Diagnosed** : 24 Aug 2023
Unique Number : 10617418 **Diagnostician** : Don Baldrige
Test Package : IND 2 (Additional Tests: KF)

MARATHON PETROLEUM CO.
 101 12TH ST
 CATLETTSBURG, KY
 US 41169
 Contact: CORY GUMBERT
 cagumbert@marathonpetroleum.com
 T: (606)585-3950
 F: x:

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)