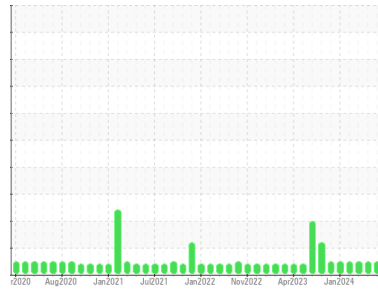




OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Area

Kentucky

Machine Id

[Kentucky] Oil - Starboard Genset

Component

Starboard Genset

Fluid

DIESEL ENGINE OIL SAE 15W40 (7 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 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 | | WC0874597 | WC0874599 | WC0845801 |
| Sample Date | Client Info | | 09 Jul 2024 | 09 Jun 2024 | 25 Apr 2024 |
| Machine Age | hrs | Client Info | 9104 | 8620 | 8272 |
| Oil Age | hrs | Client Info | 484 | 420 | 76 |
| Oil Changed | Client Info | | Changed | Changed | 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 | >50 | 4 | 5 | 2 |
| Chromium | ppm | ASTM D5185m | >4 | 0 | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | 0 | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Silver | ppm | ASTM D5185m | >5 | 0 | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >12 | <1 | 2 | 1 |
| Lead | ppm | ASTM D5185m | >17 | 0 | <1 | <1 |
| Copper | ppm | ASTM D5185m | >70 | 2 | 2 | 2 |
| Tin | ppm | ASTM D5185m | >15 | 0 | <1 | <1 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | <1 | <1 |

ADDITIVES

| | method | limit/base | current | history1 | history2 | |
|------------|--------|-------------|---------|-------------|----------|------|
| Boron | ppm | ASTM D5185m | 250 | 73 | 9 | 10 |
| Barium | ppm | ASTM D5185m | 10 | 0 | 0 | <1 |
| Molybdenum | ppm | ASTM D5185m | 100 | 67 | 65 | 61 |
| Manganese | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 450 | 1375 | 1513 | 1389 |
| Calcium | ppm | ASTM D5185m | 3000 | 1387 | 1252 | 1206 |
| Phosphorus | ppm | ASTM D5185m | 1150 | 1143 | 1089 | 1094 |
| Zinc | ppm | ASTM D5185m | 1350 | 1396 | 1360 | 1276 |
| Sulfur | ppm | ASTM D5185m | 4250 | 4051 | 3413 | 3471 |

CONTAMINANTS

| | method | limit/base | current | history1 | history2 | |
|-----------|--------|-------------|---------|------------|----------|-----|
| Silicon | ppm | ASTM D5185m | >25 | 6 | 3 | 5 |
| Sodium | ppm | ASTM D5185m | >158 | 2 | 3 | 1 |
| Potassium | ppm | ASTM D5185m | >20 | 0 | 1 | 2 |
| Water | % | ASTM D6304 | >0.1 | NEG | NEG | NEG |

INFRA-RED

| | method | limit/base | current | history1 | history2 | |
|-----------|----------|-------------|---------|-------------|----------|------|
| Soot % | % | *ASTM D7844 | | 0.2 | 0.1 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 8.3 | 8.1 | 6.7 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 21.0 | 19.6 | 18.7 |

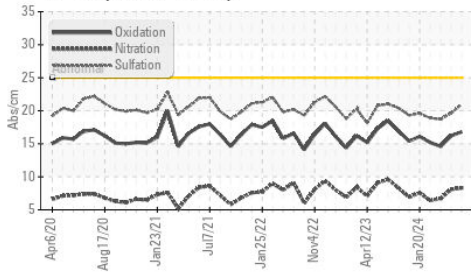
FLUID DEGRADATION

| | method | limit/base | current | history1 | history2 | |
|------------------|----------|-------------|---------|--------------|----------|-------|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 16.8 | 16.2 | 14.6 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 8.5 | 11.68 | 12.03 | 12.58 |

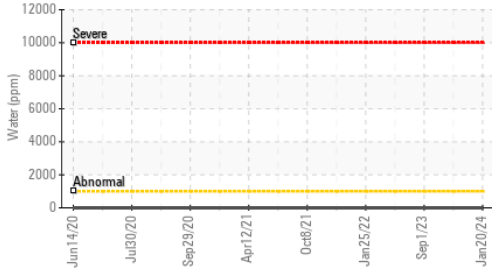


OIL ANALYSIS REPORT

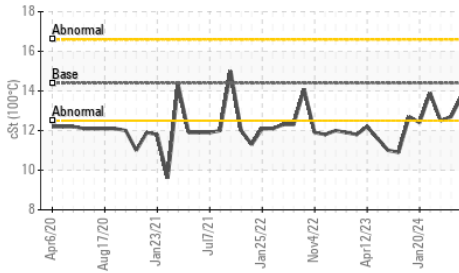
FT-IR (Direct Trend)



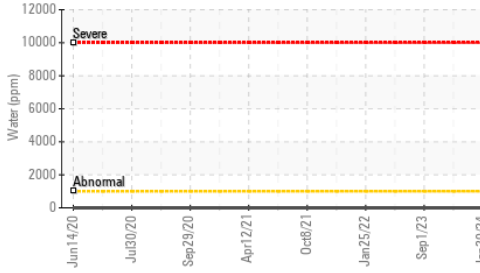
Water (KF)



Viscosity @ 100°C



Water (KF)

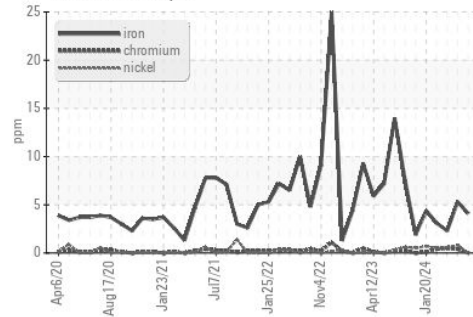


| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | NONE |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

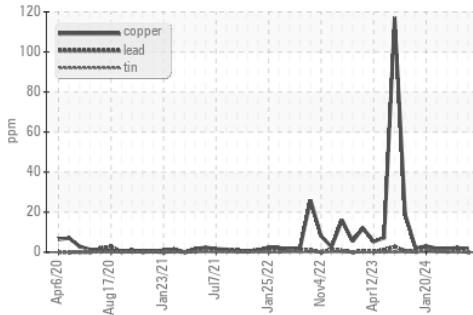
| FLUID PROPERTIES | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 14.4 | 13.7 | 12.7 |

GRAPHS

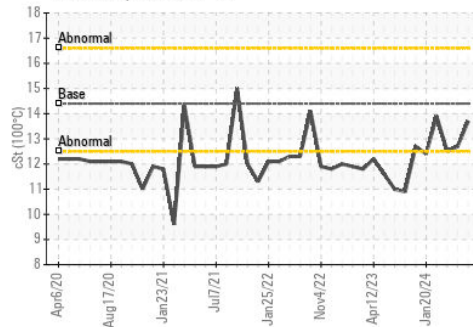
Ferrous Alloys



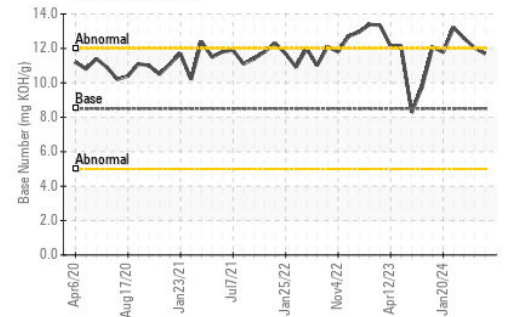
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

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

Sample No. : WC0874597

Lab Number : 06236281

Unique Number : 11125115

Test Package : IND 2 (Additional Tests: KF)

Received : 15 Jul 2024

Tested : 16 Jul 2024

Diagnosed : 16 Jul 2024 - Sean Felton

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)