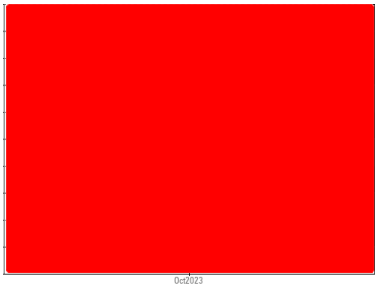
# PROBLEM SUMMARY

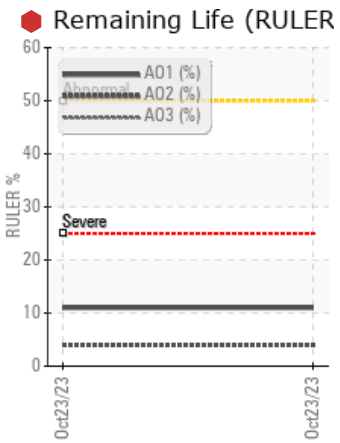
Sample Rating Trend

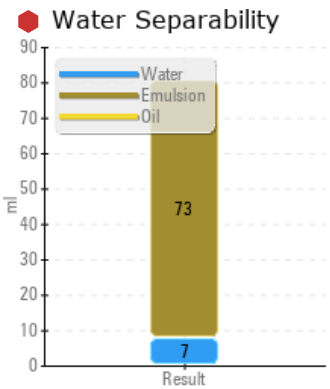


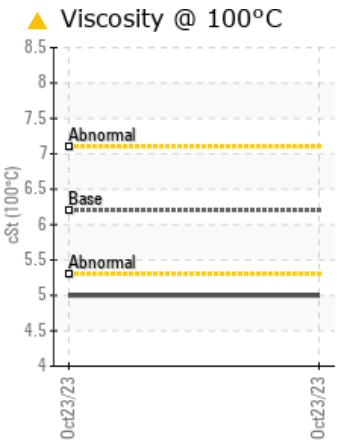
**DEGRADATION**

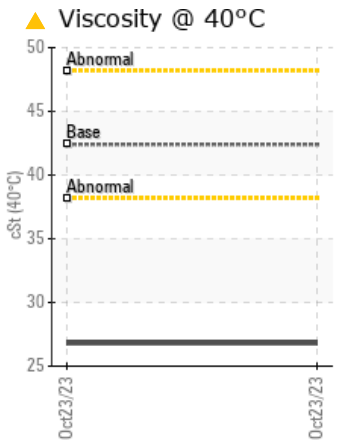
Area
## MPG GENERATOR [02591388]
Machine Id
## 71-T-3580B (71-G-3300B)
Component
**Turbine**
Fluid
**MOBIL DTE 846 (--- LTR)**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend an early resample to monitor this condition. The fluid was specified as MOBIL DTE 846, however, a fluid match indicates that this fluid is Phosphate Ester (PE) Turbine Oil. Please confirm the oil type and grade on your next sample. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

## PROBLEMATIC TEST RESULTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample Status | | | | **SEVERE** | --- | --- |
| Anti-Oxidant 1 | % | ASTM D6971* | <25 | **11** | --- | --- |
| Anti-Oxidant 2 | % | ASTM D6971* | <25 | **4** | --- | --- |
| Visc @ 40°C | cSt | ASTM D7279(m) | 42.4 | **26.8** | --- | --- |
| Visc @ 100°C | cSt | ASTM D7279(m) | 6.2 | **5** | --- | --- |
| Separability | oil/h2o/em | ASTM D1401* | 40/40/0 | **0/7/73 (30)** | --- | --- |


**Customer Id:** MAKMOU
**Sample No.:** WC0814816
**Lab Number:** 02591449
**Test Package:** AOM 3

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
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Bill.Quesnel@wearcheck.com

*To change component or sample information:*
Gloria Gonzalez +1 (289)291-4643 x4643
gloria.gonzalez@wearcheck.com

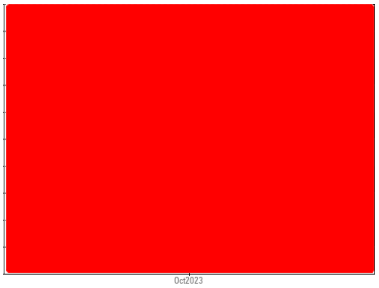
## RECOMMENDED ACTIONS

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Service/change Fluid | --- | --- | ? | The oil is near the end of it's useful service life, recommend schedule an oil change. |
| Resample | --- | --- | ? | We recommend an early resample to monitor this condition. |
| Alert | --- | --- | ? | The fluid was specified as MOBIL DTE 846, however, a fluid match indicates that this fluid is Phosphate Ester (PE) Turbine Oil. Please confirm the oil type and grade on your next sample. |
| Information Required | --- | --- | ? | NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. |
| Filter Fluid | --- | --- | ? | We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. |

## HISTORICAL DIAGNOSIS

# OIL ANALYSIS REPORT

Sample Rating Trend




DEGRADATION

Area
## MPG GENERATOR [02591388]
Machine Id
## 71-T-3580B (71-G-3300B)
Component
**Turbine**
Fluid
**MOBIL DTE 846 (--- LTR)**

## DIAGNOSIS

**Recommendation**

We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend an early resample to monitor this condition. The fluid was specified as MOBIL DTE 846, however, a fluid match indicates that this fluid is Phosphate Ester (PE) Turbine Oil. Please confirm the oil type and grade on your next sample. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

**Wear**

All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

**Contaminants**

Water Separability results (ASTM D1401) are poor and indicate that the oil will form emulsions with water. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible.

**Oil Condition**

Linear Sweep Voltammetry (RULER– ASTM D6971) testing indicates both anti-oxidants present in the oil will soon be depleted. Viscosity of sample indicates oil is within ISO 22 range, advise investigate. Rust Prevention test (ASTM D665) indicates the oil retains good anti-corrosion properties. The AN level is acceptable for this fluid.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0814816** | --- | --- |
| Sample Date | | Client Info | | **23 Oct 2023** | --- | --- |
| Machine Age | hrs | Client Info | | **0** | --- | --- |
| Oil Age | hrs | Client Info | | **0** | --- | --- |
| Oil Changed | | Client Info | | **N/A** | --- | --- |
| Sample Status | | | | **SEVERE** | --- | --- |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| PQ | | ASTM D8184* | | **0** | --- | --- |
| Iron | ppm | ASTM D5185(m) | >15 | **0** | --- | --- |
| Chromium | ppm | ASTM D5185(m) | >4 | **0** | --- | --- |
| Nickel | ppm | ASTM D5185(m) | >2 | **<1** | --- | --- |
| Titanium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Silver | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Aluminum | ppm | ASTM D5185(m) | >10 | **0** | --- | --- |
| Lead | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Copper | ppm | ASTM D5185(m) | >5 | **<1** | --- | --- |
| Tin | ppm | ASTM D5185(m) | >5 | **0** | --- | --- |
| Antimony | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Vanadium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Beryllium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Cadmium | ppm | ASTM D5185(m) | | **0** | --- | --- |

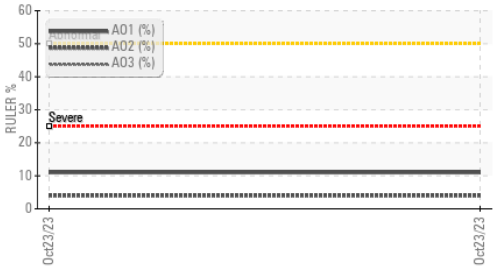
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Barium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Molybdenum | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Manganese | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Magnesium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Calcium | ppm | ASTM D5185(m) | | **0** | --- | --- |
| Phosphorus | ppm | ASTM D5185(m) | | **2941** | --- | --- |
| Zinc | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Sulfur | ppm | ASTM D5185(m) | | **1** | --- | --- |
| Lithium | ppm | ASTM D5185(m) | | **<1** | --- | --- |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185(m) | >15 | **1** | --- | --- |
| Sodium | ppm | ASTM D5185(m) | | **<1** | --- | --- |
| Potassium | ppm | ASTM D5185(m) | >20 | **0** | --- | --- |
| Water | % | ASTM D6304* | >0.03 | **0.028** | --- | --- |
| ppm Water | ppm | ASTM D6304* | >300 | **286.3** | --- | --- |

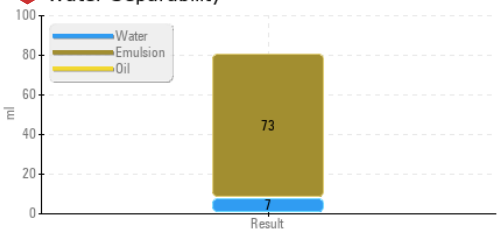
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | ASTM D7844* | | **0.2** | --- | --- |
| Nitration | Abs/cm | ASTM D7624* | | **8.1** | --- | --- |
| Sulfation | Abs/.1mm | ASTM D7415* | | **168.8** | --- | --- |

# OIL ANALYSIS REPORT

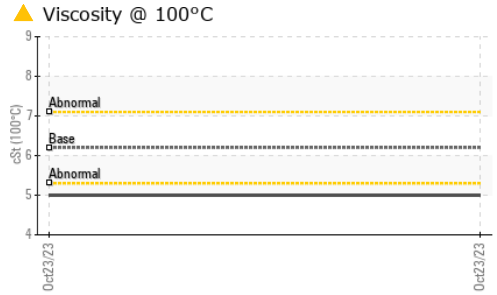
Remaining Life (RULER)



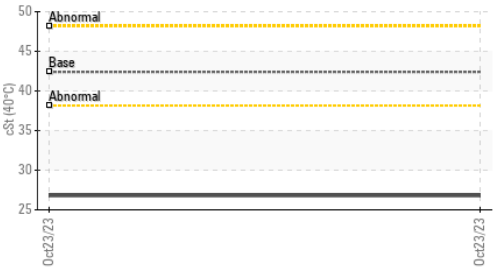

Water Separability



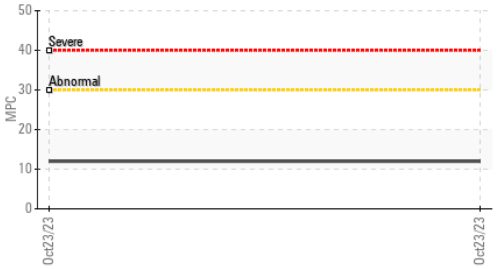

Viscosity @ 100°C




Viscosity @ 40°C




Varnish Potential



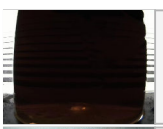

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >2500 | **272** | --- | --- |
| Particles >6µm | | ASTM D7647 | >640 | **111** | --- | --- |
| Particles >14µm | | ASTM D7647 | >80 | **14** | --- | --- |
| Particles >21µm | | ASTM D7647 | >20 | **3** | --- | --- |
| Particles >38µm | | ASTM D7647 | >4 | **1** | --- | --- |
| Particles >71µm | | ASTM D7647 | >3 | **1** | --- | --- |
| Oil Cleanliness | | ISO 4406 (c) | >18/16/13 | **15/14/11** | --- | --- |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | ASTM D7414* | | **226.9** | --- | --- |
| Acid Number (AN) | mg KOH/g | ASTM D974* | | **0.11** | --- | --- |
| Anti-Oxidant 1 | % | ASTM D6971* | <25 | **11** | --- | --- |
| Anti-Oxidant 2 | % | ASTM D6971* | <25 | **4** | --- | --- |
| MPC Varnish Potential | Scale | ASTM D7843(m)* | >15 | **12** | --- | --- |

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | Visual* | NONE | **NONE** | --- | --- |
| Yellow Metal | scalar | Visual* | NONE | **NONE** | --- | --- |
| Precipitate | scalar | Visual* | NONE | **NONE** | --- | --- |
| Silt | scalar | Visual* | NONE | **NONE** | --- | --- |
| Debris | scalar | Visual* | NONE | **NONE** | --- | --- |
| Sand/Dirt | scalar | Visual* | NONE | **NONE** | --- | --- |
| Appearance | scalar | Visual* | NORML | **NORML** | --- | --- |
| Odor | scalar | Visual* | NORML | **NORML** | --- | --- |
| Emulsified Water | scalar | Visual* | >0.03 | **NEG** | --- | --- |
| Free Water | scalar | Visual* | | **NEG** | --- | --- |

| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D7279(m) | 42.4 | **26.8** | --- | --- |
| Visc @ 100°C | cSt | ASTM D7279(m) | 6.2 | **5** | --- | --- |
| Viscosity Index (VI) | Scale | ASTM D2270* | 106 | **112** | --- | --- |
| Separability | oil/h2o/em | ASTM D1401* | 40/40/0 | **0/7/73 (30)** | --- | --- |
| Air Release Time | min | ASTM D3427* | 2 | **1.40** | --- | --- |
| Foam Tendency | I/II/III | ASTM D892* | 20 | **10/10/10** | --- | --- |
| Foam Stability | I/II/III | ASTM D892* | 0 | **0/0/0** | --- | --- |
| ASTM Color | scalar | ASTM D1500* | | **7.5** | --- | --- |
| Rust Prevention | PASS/FAIL | ASTM D665* | PASS | **PASS** | --- | --- |
| Oxidation Test (RPVOT) | minutes | ASTM D2272* | 1100 | **571** | --- | --- |

| SEDIMENT | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Pentane Insolubles | % | ASTM D893(m)* | | **0.020** | --- | --- |
| Toluene Insolubles | % | ASTM D893(m)* | | **0.026** | --- | --- |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | no image | no image |
| Bottom | | |  | no image | no image |
| MPC | | |  | no image | no image |

CALA
ISO 17025:2017 Accredited Laboratory

**Laboratory**
**Sample No.**
**Lab Number**
**Unique Number**
**Test Package**

*To discuss this sample report, cc*
*Test denoted (*) outside scope o*
*Validity of results and interpretation are based on the sample and information as supplied.*

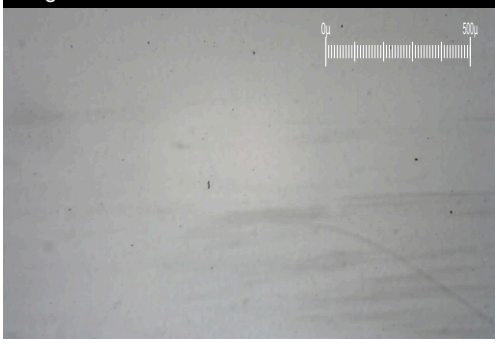
F: (709)364-3501

# FERROGRAPHY REPORT

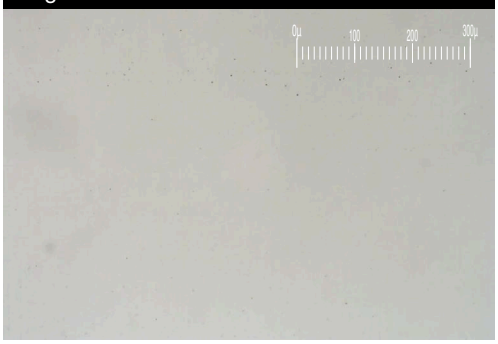
Area
## MPG GENERATOR [02591388]
Machine Id
## 71-T-3580B (71-G-3300B)
Component
**Turbine**
Fluid
**MOBIL DTE 846 (--- LTR)**

Magn: 200x Illum: BC

Magn: 50x Illum: RW



Magn: 100x Illum: RW

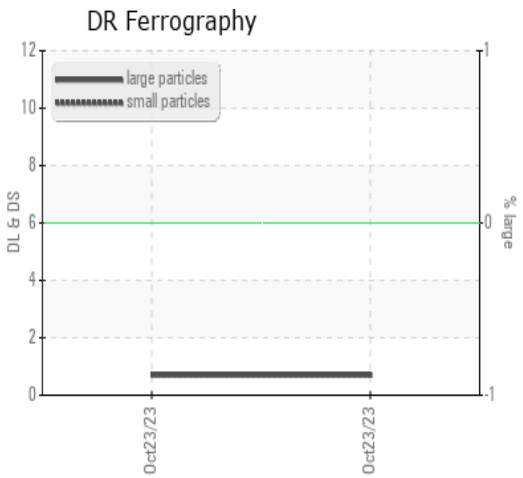


| DR-FERROGRAPHY | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Large Particles | | DR-Ferr* | | **0.7** | --- | --- |
| Small Particles | | DR-Ferr* | | **0.7** | --- | --- |
| Total Particles | | DR-Ferr* | >--- | **1.4** | --- | --- |
| Large Particles Percentage | % | DR-Ferr* | | **0** | --- | --- |
| Severity Index | | DR-Ferr* | | **0** | --- | --- |

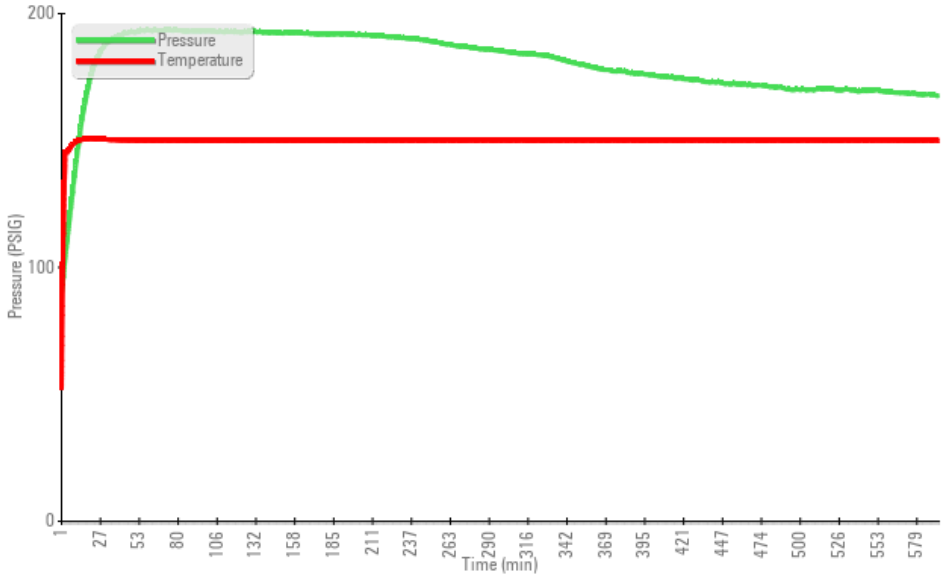
| FERROGRAPHY | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Ferrous Rubbing | Scale 0-10 | ASTM D7684* | | **1** | | |
| Ferrous Sliding | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Cutting | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Rolling | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Break-in | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Spheres | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Black Oxides | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Red Oxides | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Corrosive | Scale 0-10 | ASTM D7684* | | | | |
| Ferrous Other | Scale 0-10 | ASTM D7684* | | | | |
| Nonferrous Rubbing | Scale 0-10 | ASTM D7684* | | | | |
| Nonferrous Sliding | Scale 0-10 | ASTM D7684* | | | | |
| Nonferrous Cutting | Scale 0-10 | ASTM D7684* | | | | |
| Nonferrous Rolling | Scale 0-10 | ASTM D7684* | | | | |
| Nonferrous Other | Scale 0-10 | ASTM D7684* | | | | |
| Carbonaceous Material | Scale 0-10 | ASTM D7684* | | | | |
| Lubricant Degradation | Scale 0-10 | ASTM D7684* | | | | |
| Sand/Dirt | Scale 0-10 | ASTM D7684* | | **1** | | |
| Fibres | Scale 0-10 | ASTM D7684* | | | | |
| Spheres | Scale 0-10 | ASTM D7684* | | | | |
| Other | Scale 0-10 | ASTM D7684* | | | | |

### WEAR

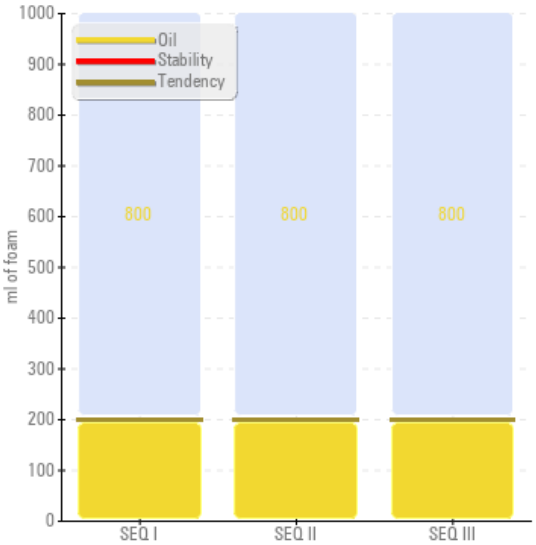
All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.



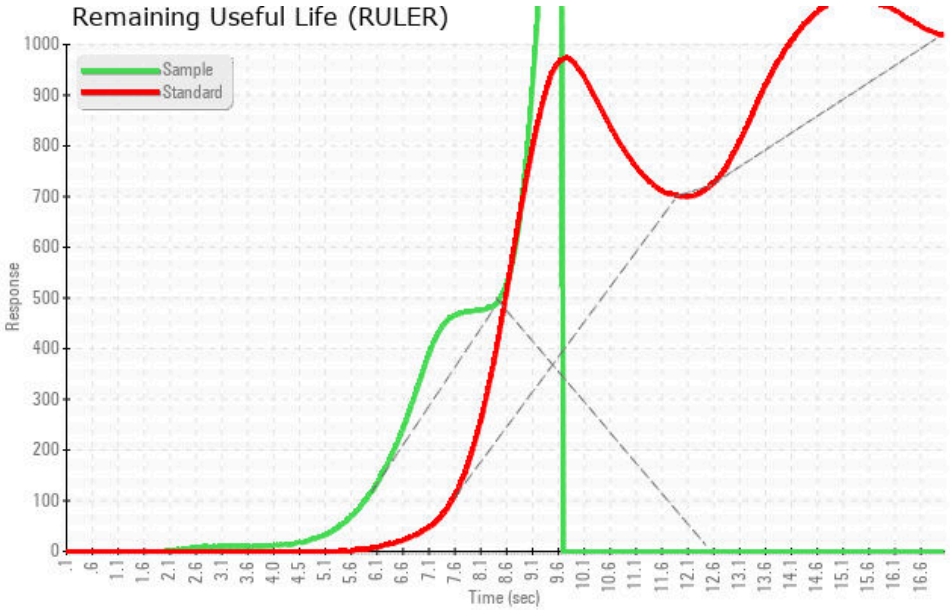
## Rotating Pressure Vessel Oxidation Test



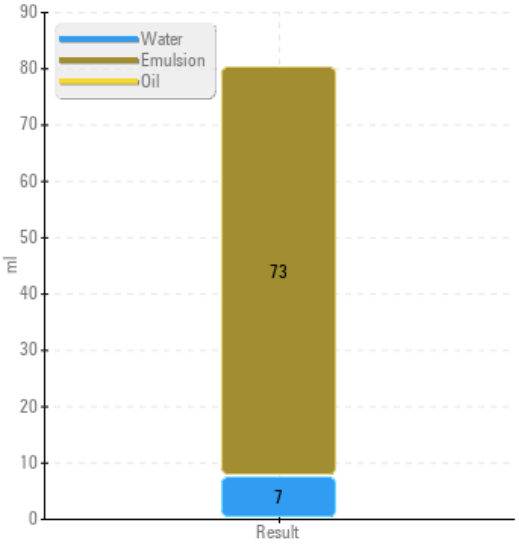

## Foaming SEQ I/II/III



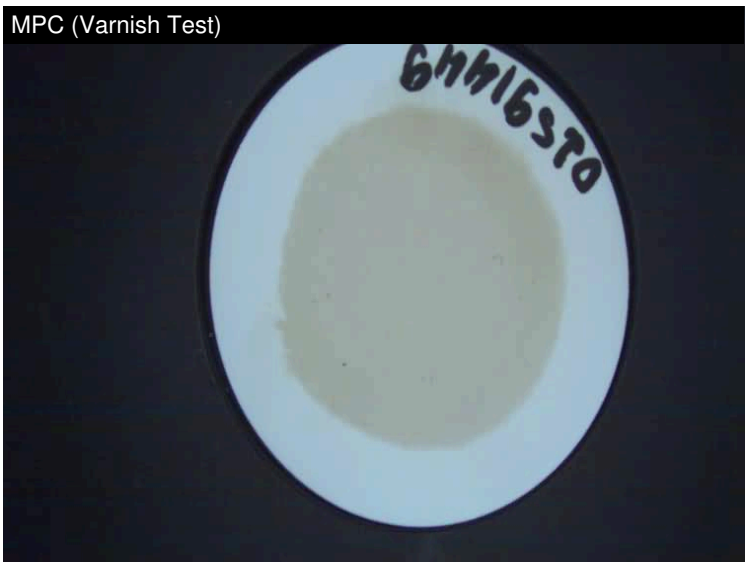

## Remaining Useful Life (RULER)




## Water Separability




## MPC (Varnish Test)



## Sample Color & Clarity