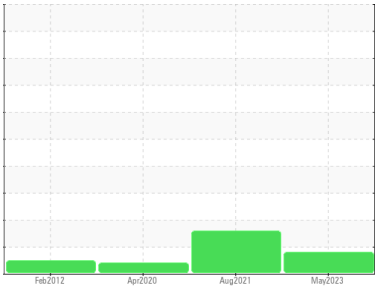
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

# PROBLEM SUMMARY

**Sample Rating Trend**

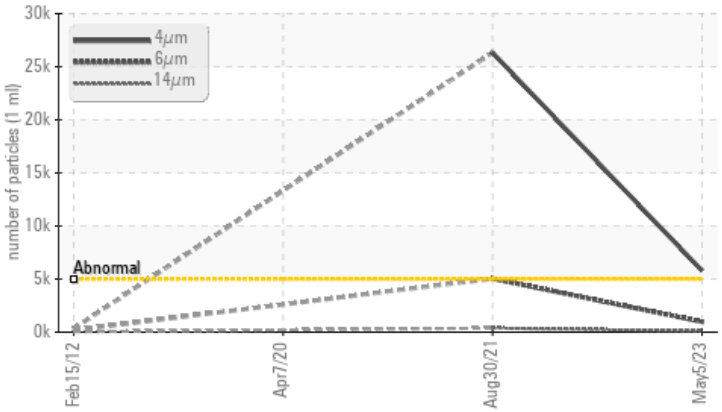



**ISO**

Machine Id
**F-03**
Component
**Hydraulic System**
Fluid
**MOBIL DTE 10 EXCEL 32 (45 GAL)**

## COMPONENT CONDITION SUMMARY

▲ Particle Trend




## RECOMMENDATION

Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s).

## PROBLEMATIC TEST RESULTS

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample Status | | | | **MARGINAL** | ABNORMAL | ABNORMAL |
| Particles >4µm | | ASTM D7647 | >5000 | ▲ **5797** | ▲ 26316 | --- |
| Oil Cleanliness | | ISO 4406 (c) | >19/17/14 | ▲ **20/17/14** | ▲ 22/20/16 | --- |

**Customer Id:** MITWHI
**Sample No.:** MHI021625
**Lab Number:** 06016381
**Test Package:** IND 2

*To manage this report scan the QR code*

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*To change component or sample information:*
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customerservice@wearcheck.com

## RECOMMENDED ACTIONS

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Change Filter | --- | --- | ? | Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s). |
| Resample | --- | --- | ? | Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s). |

## HISTORICAL DIAGNOSIS

**30 Aug 2021 Diag: Doug Bogart**

ISO

Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s).All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid.

view report

**07 Apr 2020 Diag: Doug Bogart**

VIS DEBRIS

Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s). We were unable to perform a particle count due to a high concentration of particles present in this sample.All component wear rates are normal. Moderate concentration of visible dirt/debris present in the oil. The AN level is acceptable for this fluid.

view report

**15 Feb 2012 Diag: Doug Bogart**

NORMAL

Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable. The condition of oil is suitable for further service.

view report

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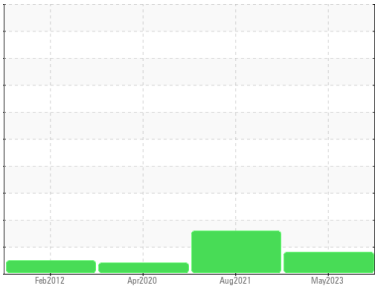
# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Machine Id
**F-03**
Component
**Hydraulic System**
Fluid
**MOBIL DTE 10 EXCEL 32 (45 GAL)**

## DIAGNOSIS

**Recommendation**
Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s).

**Wear**
All component wear rates are normal.

**Contamination**
There is a moderate amount of silt (particulates < 14 microns in size) present 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 | | **MHI021625** | MHI019987 | MHI023846 |
| Sample Date | | Client Info | | **05 May 2023** | 30 Aug 2021 | 07 Apr 2020 |
| Machine Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Age | hrs | Client Info | | **0** | 0 | 477977 |
| Oil Changed | | Client Info | | **N/A** | N/A | Not Changd |
| Sample Status | | | | **MARGINAL** | ABNORMAL | ABNORMAL |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >50 | **3** | 2 | 1 |
| Chromium | ppm | ASTM D5185m | >20 | **<1** | 0 | 0 |
| Nickel | ppm | ASTM D5185m | >20 | **<1** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | **2** | 0 | 0 |
| Lead | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |
| Copper | ppm | ASTM D5185m | >20 | **<1** | <1 | <1 |
| Tin | ppm | ASTM D5185m | >20 | **0** | 0 | 0 |
| Antimony | ppm | ASTM D5185m | | **---** | 0 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **<1** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Manganese | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Magnesium | ppm | ASTM D5185m | | **1** | 0 | <1 |
| Calcium | ppm | ASTM D5185m | 120 | **110** | 124 | 111 |
| Phosphorus | ppm | ASTM D5185m | 475 | **433** | 481 | 445 |
| Zinc | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Sulfur | ppm | ASTM D5185m | 1275 | **1345** | 1197 | 1184 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >+30 | **<1** | <1 | 2 |
| Sodium | ppm | ASTM D5185m | | **<1** | 2 | 1 |
| Potassium | ppm | ASTM D5185m | >20 | **1** | 0 | 0 |
| Water | % | ASTM D6304 | >0.1 | **0.009** | 0.006 | 0.001 |
| ppm Water | ppm | ASTM D6304 | >1000 | **97** | 63.3 | 3.4 |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >5000 | ▲ **5797** | ▲ 26316 | --- |
| Particles >6µm | | ASTM D7647 | >1300 | **976** | ▲ 5040 | --- |
| Particles >14µm | | ASTM D7647 | >160 | **87** | ▲ 378 | --- |
| Particles >21µm | | ASTM D7647 | >40 | **20** | ▲ 99 | --- |
| Particles >38µm | | ASTM D7647 | >10 | **1** | 4 | --- |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | --- |
| Oil Cleanliness | | ISO 4406 (c) | >19/17/14 | ▲ **20/17/14** | ▲ 22/20/16 | --- |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **0.191** | 0.04 | 0.082 |

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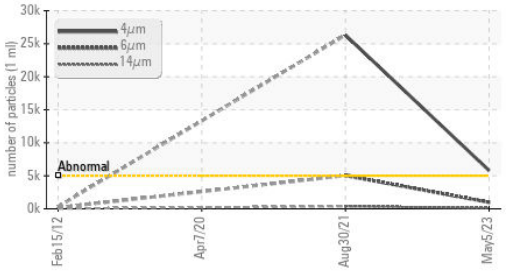
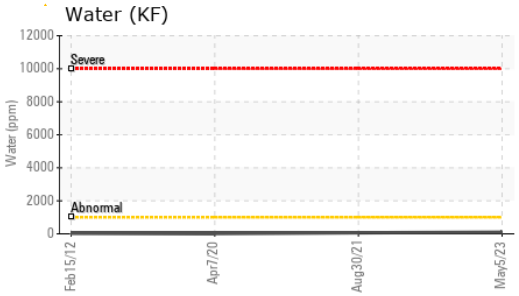
# OIL ANALYSIS REPORT

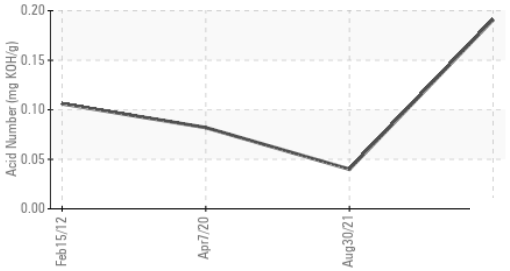
Particle Trend



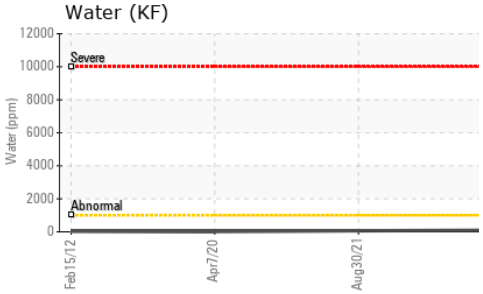

Water (KF)



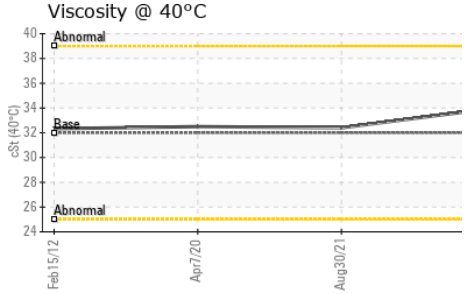

Acid Number




Water (KF)

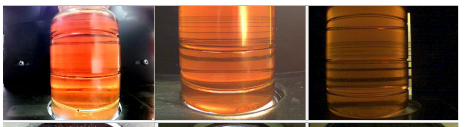
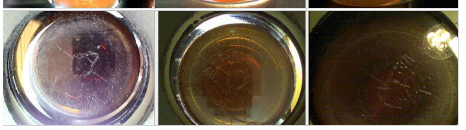



Viscosity @ 40°C



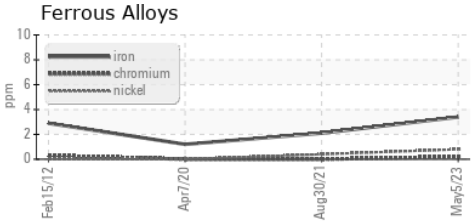

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **LIGHT** | VLITE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Silt | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Debris | scalar | *Visual | NONE | **NONE** | VLITE | ▲ MODER |
| 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 | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 32 | **33.9** | 32.4 | 32.5 |

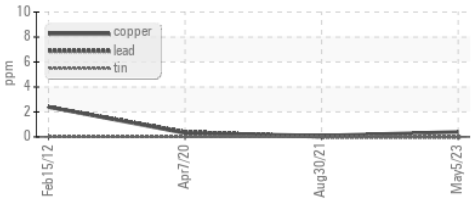
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |

## GRAPHS

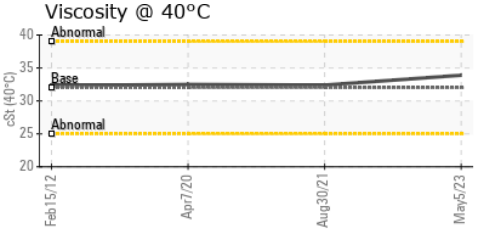
Ferrous Alloys



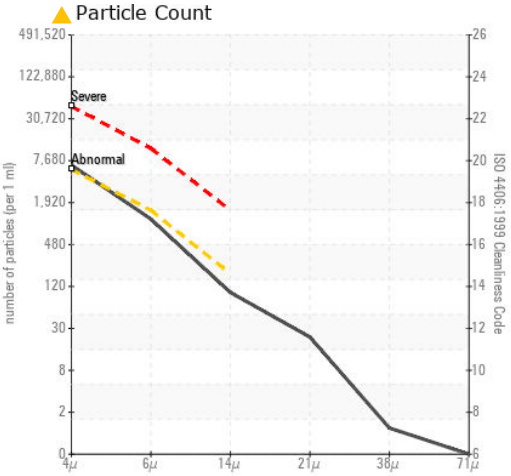

Non-ferrous Metals



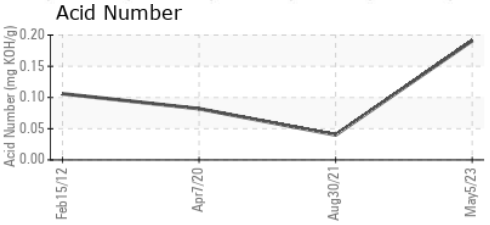

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : MHI021625
**Lab Number** : 06016381
**Unique Number** : 10755525
**Test Package** : IND 2 ( Additional Tests: KF )

**Received** : 24 Nov 2023
**Diagnosed** : 28 Nov 2023
**Diagnostician** : Jonathan Hester

*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)*

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