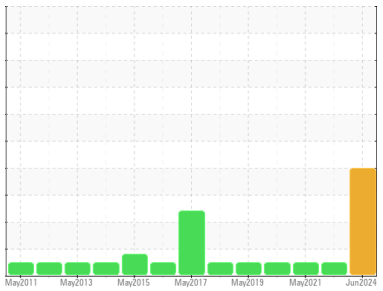
# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Machine Id
## ALSTOM 3415
Component
**Hydraulic System**
Fluid
**ESSO UNIVIS N 32 (55 GAL)**

## DIAGNOSIS

**▲ Recommendation**
We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation.

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

**▲ Contamination**
There is a high amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code.

**Fluid Condition**
The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0798768** | WC0643748 | WC0560215 |
| Sample Date | | Client Info | | **11 Jun 2024** | 01 May 2022 | 04 May 2021 |
| Machine Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **SEVERE** | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Water | | WC Method | >0.1 | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >20 | **<1** | 0 | 3 |
| Chromium | ppm | ASTM D5185m | >10 | **1** | <1 | 3 |
| Nickel | ppm | ASTM D5185m | >10 | **8** | 7 | 22 |
| Titanium | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | <1 | 0 |
| Aluminum | ppm | ASTM D5185m | >10 | **0** | 0 | 0 |
| Lead | ppm | ASTM D5185m | >10 | **9** | 5 | 16 |
| Copper | ppm | ASTM D5185m | >75 | **6** | 3 | 8 |
| Tin | ppm | ASTM D5185m | >10 | **0** | 0 | <1 |
| Antimony | ppm | ASTM D5185m | | **---** | --- | 0 |
| Vanadium | ppm | ASTM D5185m | | **<1** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

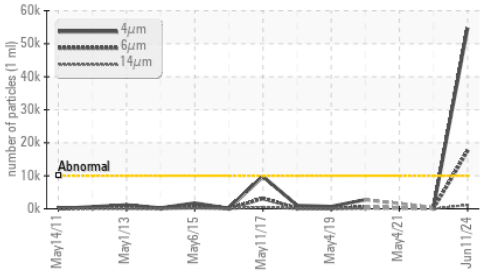
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | .1 | **0** | 0 | <1 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | .3 | **0** | 0 | 0 |
| Manganese | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Magnesium | ppm | ASTM D5185m | 0 | **<1** | 0 | 1 |
| Calcium | ppm | ASTM D5185m | 74 | **51** | 53 | 62 |
| Phosphorus | ppm | ASTM D5185m | 266 | **339** | 352 | 346 |
| Zinc | ppm | ASTM D5185m | 338 | **432** | 445 | 458 |
| Sulfur | ppm | ASTM D5185m | | **2759** | 2134 | 3252 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >20 | **2** | <1 | <1 |
| Sodium | ppm | ASTM D5185m | | **10** | 0 | <1 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |

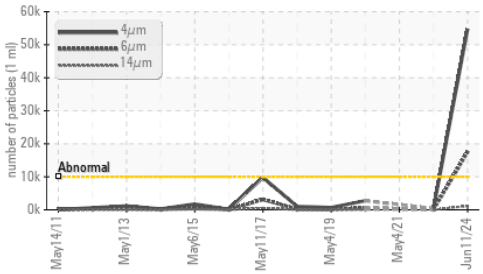
| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >10000 | ▲ **54751** | 383 | --- |
| Particles >6µm | | ASTM D7647 | >1300 | ▲ **17509** | 89 | --- |
| Particles >14µm | | ASTM D7647 | >160 | ▲ **1177** | 8 | --- |
| Particles >21µm | | ASTM D7647 | >40 | ▲ **251** | 3 | --- |
| Particles >38µm | | ASTM D7647 | >10 | **2** | 0 | --- |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | --- |
| Oil Cleanliness | | ISO 4406 (c) | >20/17/14 | ▲ **23/21/17** | 16/14/10 | --- |

# OIL ANALYSIS REPORT

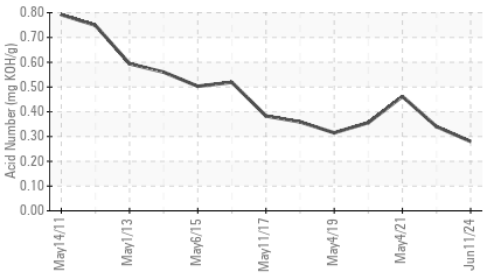
Particle Trend



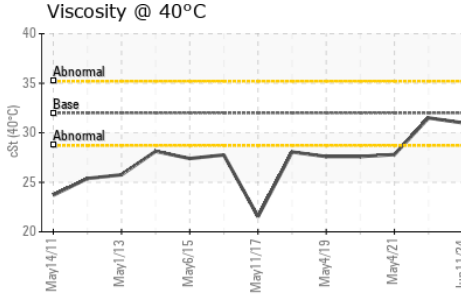

Particle Trend




Acid Number



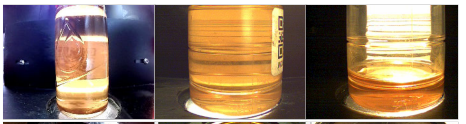
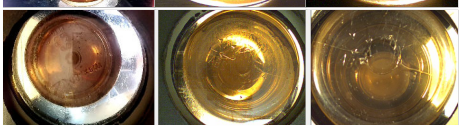

Viscosity @ 40°C




| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **0.28** | 0.34 | 0.462 |

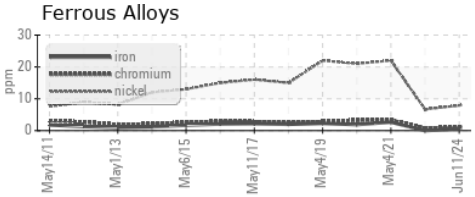
| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Silt | scalar | *Visual | NONE | **LIGHT** | NONE | NONE |
| Debris | scalar | *Visual | NONE | **NONE** | VLITE | NONE |
| 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 | **31.0** | 31.5 | 27.8 |

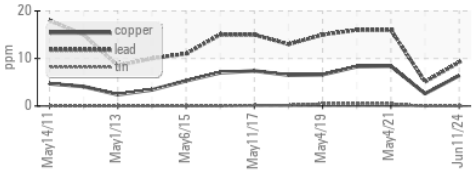
| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |

## GRAPHS

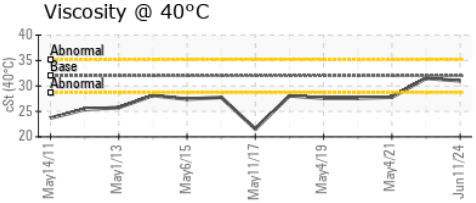
Ferrous Alloys



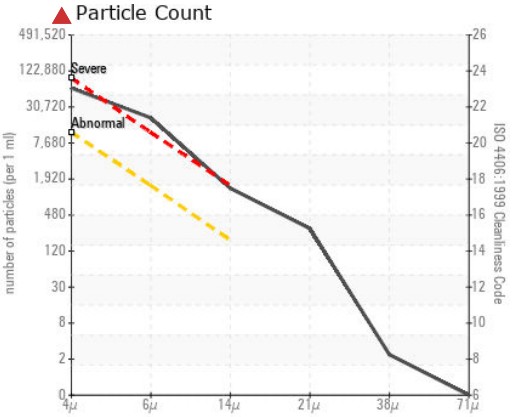

Non-ferrous Metals



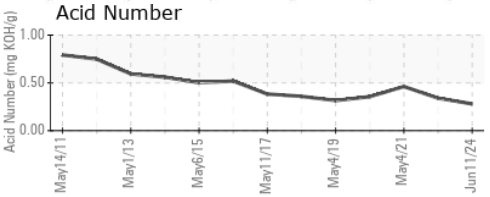

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0798768
**Lab Number** : 06212306
**Unique Number** : 11085170
**Test Package** : MOB 2

**Received** : 17 Jun 2024
**Tested** : 19 Jun 2024
**Diagnosed** : 19 Jun 2024 - Wes Davis

*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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Report Id: AMTRAK [WUSCAR] 06212306 (Generated: 06/22/2024 01:36:21) Rev: 1

Contact/Location: MICHAEL PORTER - AMTRAK