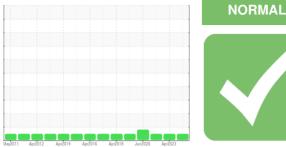


OIL ANALYSIS REPORT

Sample Rating Trend





Machine Id

ALSTOM 3312 Component Hydraulic System

ESSO UNIVIS N 32 (55 GAL)

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable.

Fluid Condition

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

| SAMPLE INFORM | ATION | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|--|--|
| Sample Number | | Client Info | | WC0798805 | WC0673314 | WC0560234 |
| Sample Date | | Client Info | | 17 Apr 2024 | 13 Apr 2023 | 24 Apr 2022 |
| 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 | | | | NORMAL | 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 | 0 | 2 | 2 |
| Chromium | ppm | ASTM D5185m | >10 | 1 | 2 | 4 |
| Nickel | ppm | ASTM D5185m | >10 | 11 | 16 | 34 |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Silver | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >10 | 0 | 0 | <1 |
| Lead | ppm | ASTM D5185m | >10 | 9 | 8 | 16 |
| Copper | ppm | ASTM D5185m | >75 | 4 | 6 | 14 |
| Tin | ppm | ASTM D5185m | >10 | <1 | 0 | <1 |
| Antimony | ppm | ASTM D5185m | | | | |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| | | | | | | |
| ADDITIVES | | method | limit/base | current | history1 | history2 |
| ADDITIVES Boron | ppm | | limit/base | current 0 | history1 0 | history2 1 |
| | ppm ppm | | | | | |
| Boron | | ASTM D5185m | | 0 0 0 | 0 | 1 |
| Boron Barium | ppm | ASTM D5185m ASTM D5185m | .1 | 0 0 | 0 | 1 0 |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 | 0 0 0 | 0 0 0 | 1 0 0 |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 | 0 0 0 <1 | 0 0 0 0 | 1 0 0 0 |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 | 0 0 0 <1 <1 | 0 0 0 0 1 | 1 0 0 <1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 | 0 0 <1 <1 49 | 0 0 0 1 54 | 1 0 0 <1 61 380 445 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus | ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 | 0 0 <1 <1 49 337 | 0 0 0 1 54 338 | 1 0 0 <1 61 380 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 | 0 0 <1 <1 49 337 448 | 0 0 0 1 54 338 474 | 1 0 0 <1 61 380 445 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 | 0 0 <1 <1 49 337 448 2582 | 0 0 0 1 54 338 474 2418 | 1 0 0 <1 61 380 445 2578 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 | 0 0 <1 <1 49 337 448 2582 current | 0 0 0 1 54 338 474 2418 history1 | 1 0 0 <1 61 380 445 2578 history2 |
| Boron Barium Molybdenum Magaese Magnesium Calcium Chosphorus Zinc Sulfur CONTAMINANTS Silicon | ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 imit/base >20 | 0 0 2 3 3 3 3 3 7 4 4 8 2 5 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 | 0 0 0 1 54 338 474 2418 history1 2 | 1 0 0 <1 61 380 445 2578 history2 1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 imit/base >20 | 0 0 2 3 3 3 3 7 4 4 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 8 2 5 6 1 1 5 5 7 5 7 5 7 5 7 5 7 7 7 7 7 7 7 7 | 0 0 0 1 54 338 474 2418 history1 2 1 | 1 0 0 <1 61 380 445 2578 history2 1 4 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 338 limit/base >20 limit/base | 0 0 ((1) (1) (4) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4 | 0 0 0 1 54 338 474 2418 history1 2 1 1 <1 | 1 0 0 <1 61 380 445 2578 history2 1 4 0 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | .1 .3 0 74 266 338 338 limit/base >20 limit/base | 0 0 2 3 1 49 337 448 2582 <u>current</u> 1 3 1 2 5 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 0 1 54 338 474 2418 history1 2 1 <1 <1 history1 | 1 0 0 (1 61 380 445 2578 history2 1 4 0 0 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLINE Particles >4µm | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | .1 .3 .74 266 338 266 338 20 20 >20 20 20 20 20 20 20 20 20 | 0 0 0 <1 <1 49 337 448 2582 <u>current</u> 1 3 1 <u>current</u> 3453 | 0 0 0 1 54 338 474 2418 history1 2 1 <1 <1 kistory1 2826 | 1 0 0 (0 <1 61 380 445 2578 history2 1 4 0 history2 1835 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLINE Particles >4µm Particles >6µm | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | .1 .3 .74 266 338 limit/base >20 20 limit/base >20 limit/base >20 | 0 0 0 <1 <1 49 337 448 2582 <u>current</u> 1 3 1 <u>current</u> 3453 408 | 0 0 0 1 54 338 474 2418 history1 2 1 <1 <1 history1 2826 618 | 1 0 0 (1) 61 380 445 2578 history2 1 4 0 history2 1835 405 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLINE Particles >4µm Particles >14µm | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | .1 .3 .3 .74 .266 .338 | 0 0 0 <1 <1 49 337 448 2582 <i>current</i> 1 3 1 <i>current</i> 3453 408 26 | 0 0 0 1 54 338 474 2418 history1 2 2 1 <1 <1 kistory1 2826 618 25 | 1 0 0 0 <1 61 380 445 2578 history2 1 44 0 history2 1 835 405 70 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Potassium Particles >4µm Particles >14µm Particles >21µm | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647 | .1 .3 .3 74 266 338 338 imit/base >20 20 20 imit/base >10000 >1300 >160 >40 >40 | 0 0 0 <1 <1 49 337 448 2582 <u>current</u> 1 3 1 3 1 <u>current</u> 3453 408 26 6 | 0 0 0 1 54 338 474 2418 history1 2 2 1 <1 <1 2826 618 25 4 | 1 0 0 0 <1 61 380 445 2578 history2 1 4 0 history2 1835 405 70 22 |

ISO 4406 (c) >20/17/14

Oil Cleanliness

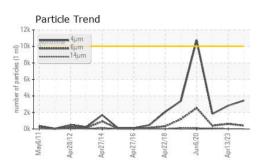
19/16/12

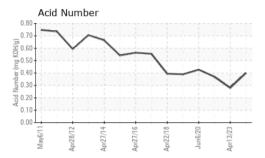
18/16/13

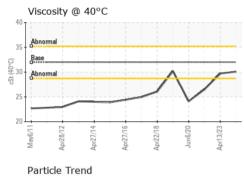
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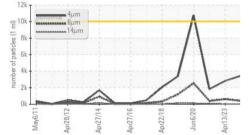


OIL ANALYSIS REPORT





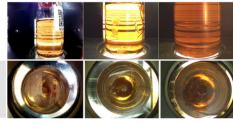




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|------------------|----------|---------------|--------------------|---------|----------------|---------------|
| FLUID DEGRADA | ATION | method | limit/base | current | history1 | history2 |
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | 0.40 | 0.28 | 0.37 |
| 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 | NONE | NONE | NONE |
| Debris | scalar | *Visual | NONE | NONE | NONE | 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 PROPERT | IES | method | limit/base | current | history1 | history2 |
| Visc @ 40°C | cSt | ASTM D445 | 32 | 30.1 | 29.7 | 26.5 |
| SAMPLE IMAGES | S | method | limit/base | current | history1 | history2 |
| | | | | | | |

Color

Bottom



Ferrous Alloys Particle Count 491,520 122,88 la 20 30,72 -20 Der 1,920 18 16 Non-ferrous Metals 480 30 120 14 20 30 12 8 0 Mav6/11 Apr22/18 pr13/23 2 N LCJUN Apr28/ Viscosity @ 40°C Acid Number (B/HOX 40 i nr (j) 35 (j) 30 Bu 향 25 Acid N 20 0.00 Apr13/23 -Apr13/23 -Apr22/18 Apr28/12 n6/20 un6/20 pr28/12 Mav6/11 Mav6/1 Apr27/14 nr77/16 pr27/14 pr27/16 pr22/18

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 AMTRAK Sample No. : WC0798805 1401 W STREET NE, HIGH SPEED RAIL 2ND FLOOR Received : 18 Apr 2024 Lab Number : 06153048 Tested : 19 Apr 2024 WASHINGTON, DC Unique Number : 10983126 Diagnosed : 22 Apr 2024 - Don Baldridge US 20018 Test Package : MOB 2 Contact: MICHAEL PORTER Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. michael.porter@amtrak.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (202)870-1399 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

Report Id: AMTRAK [WUSCAR] 06153048 (Generated: 04/22/2024 18:23:17) Rev: 1

Contact/Location: MICHAEL PORTER - AMTRAK



ISO 4406:1999 Cle