



OIL ANALYSIS REPORT

| | |
|-----------------|---------------|
| WEAR | NORMAL |
| CONTAMINATION | NORMAL |
| FLUID CONDITION | NORMAL |

Area

Locomotives

Machine Id

2002

Component

Railway diesel

Fluid

RAILWAY ENGINE OIL SAE 40 (243 GAL)

RECOMMENDATION

Resample at the next service interval to monitor. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MOB 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid. this testkit includes BN to determine the suitability of the oil for continued use.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | WC0938563 | WC0938558 | WC0891399 |
| Sample Date | | Client Info | | 21 May 2024 | 13 May 2024 | 08 May 2024 |
| Machine Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Age | hrs | Client Info | | 0 | 0 | 0 |
| Filter Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | Not Changed | Not Changed | Not Changed |
| Filter Changed | | Client Info | | Not Changed | Not Changed | Not Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |

WEAR

Component wear rates appear to be normal (unconfirmed).

| | | | | | | |
|----------|-----|---------------|------|--------------|----|----|
| Iron | ppm | ASTM D5185(m) | >100 | 18 | 14 | 15 |
| Chromium | ppm | ASTM D5185(m) | >15 | <1 | 3 | 3 |
| Nickel | ppm | ASTM D5185(m) | >5 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| Silver | ppm | ASTM D5185(m) | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185(m) | >10 | 3 | 2 | 2 |
| Lead | ppm | ASTM D5185(m) | >75 | 2 | 2 | 3 |
| Copper | ppm | ASTM D5185(m) | >90 | 10 | 10 | 11 |
| Tin | ppm | ASTM D5185(m) | >30 | <1 | 4 | 4 |
| Vanadium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |

CONTAMINATION

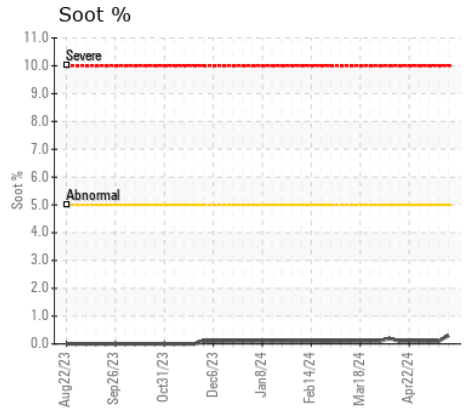
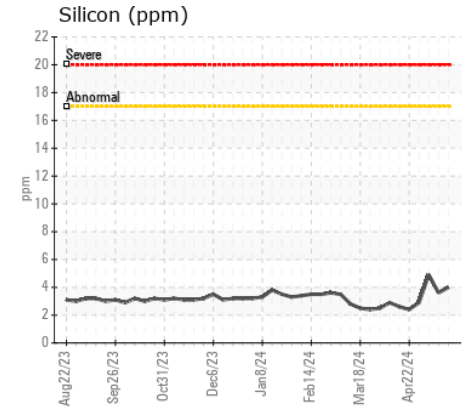
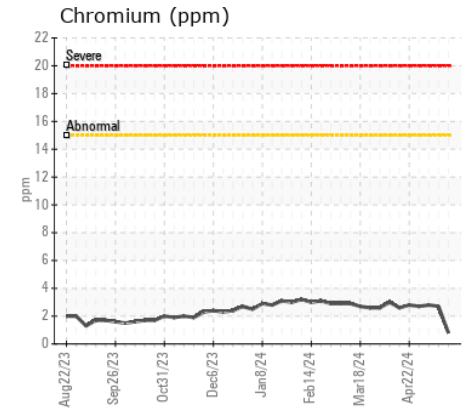
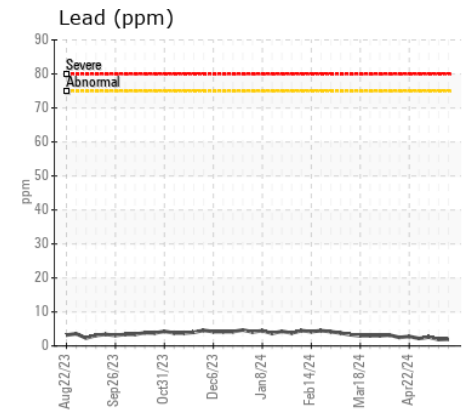
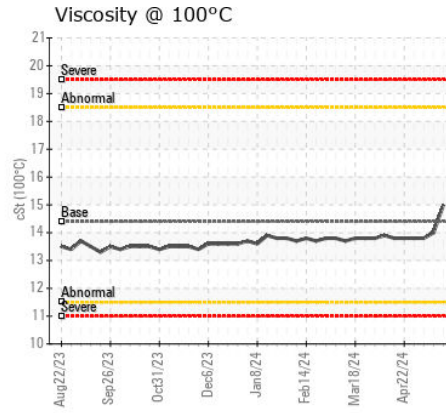
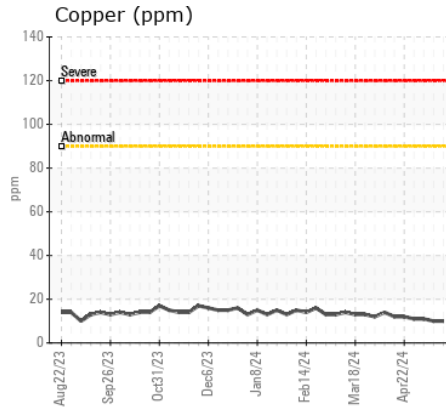
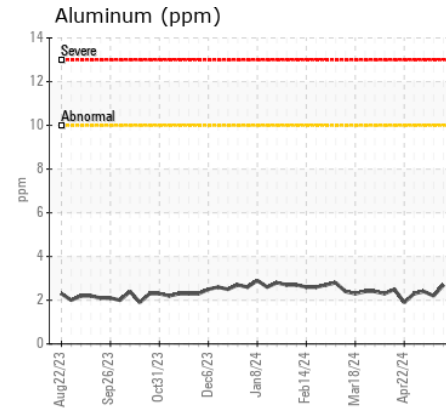
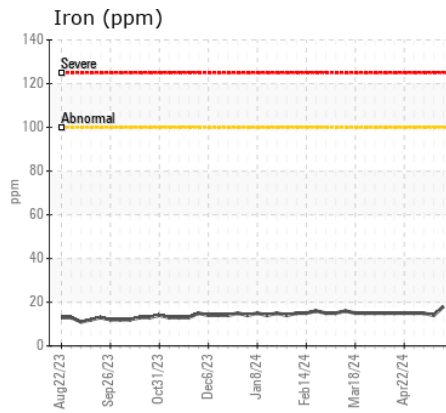
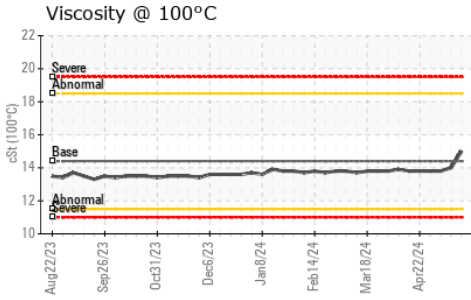
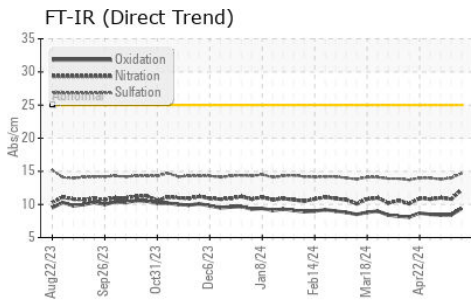
There is no indication of any contamination in the oil.

| | | | | | | |
|------------------|----------|---------------|-------|----------------|------|------|
| Silicon | ppm | ASTM D5185(m) | >17 | 4 | 4 | 5 |
| Potassium | ppm | ASTM D5185(m) | >20 | 2 | <1 | 1 |
| Fuel | | WC Method | >4 | <1.0 | <1.0 | <1.0 |
| Water | | WC Method | >0.20 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| Soot % | % | ASTM D7844* | | 0.3 | 0.1 | 0.1 |
| Nitration | Abs/cm | ASTM D7624* | >20 | 12.2 | 10.8 | 11.0 |
| Sulfation | Abs/.1mm | ASTM D7415* | >30 | 14.7 | 14.0 | 13.8 |
| Emulsified Water | scalar | Visual* | >0.20 | NEG | NEG | NEG |

FLUID CONDITION

The condition of the oil is acceptable for the time in service (unconfirmed).

| | | | | | | |
|--------------|----------|---------------|------|--------------|------|------|
| Sodium | ppm | ASTM D5185(m) | | 10 | 4 | 4 |
| Boron | ppm | ASTM D5185(m) | 10 | 2 | <1 | 1 |
| Barium | ppm | ASTM D5185(m) | 10 | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185(m) | 25 | 0 | 0 | 0 |
| Manganese | ppm | ASTM D5185(m) | | <1 | <1 | <1 |
| Magnesium | ppm | ASTM D5185(m) | 20 | 16 | 16 | 16 |
| Calcium | ppm | ASTM D5185(m) | 4500 | 4719 | 4552 | 4458 |
| Phosphorus | ppm | ASTM D5185(m) | 10 | 3 | 3 | 3 |
| Zinc | ppm | ASTM D5185(m) | 10 | 5 | 4 | 4 |
| Sulfur | ppm | ASTM D5185(m) | 5000 | 2812 | 2723 | 2748 |
| Oxidation | Abs/.1mm | ASTM D7414* | >25 | 9.4 | 8.4 | 8.4 |
| Visc @ 100°C | cSt | ASTM D7279(m) | 14.4 | 15.0 | 14.0 | 13.8 |



ISO 17025:2017
Accredited
Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9

Sample No. : WC0938563

Lab Number : 02639388

Unique Number : 5788550

Test Package : MOB 1

Received : 03 Jun 2024

Tested : 03 Jun 2024

Diagnosed : 03 Jun 2024 - Wes Davis

Vale - Transportation (Mobile Equipment)

Transportation Department, (Services - Mobile Equipment)

COPPER CLIFF, ON

CA P0M 1N0

Contact: Richard Rochon

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T: (705)682-6014

F:

To discuss this sample report, contact Customer Service at 1-800-268-2131.

Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.

Validity of results and interpretation are based on the sample and information as supplied.