



OIL ANALYSIS REPORT

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

Area

Locomotives

Machine Id

2008

Component

Railway diesel

Fluid

RAILWAY ENGINE OIL SAE 40 (243 GAL)

RECOMMENDATION

Resample at the next service interval to monitor. Please specify the component make and model with your next sample. 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.

WEAR

Component wear rates appear to be normal (unconfirmed).

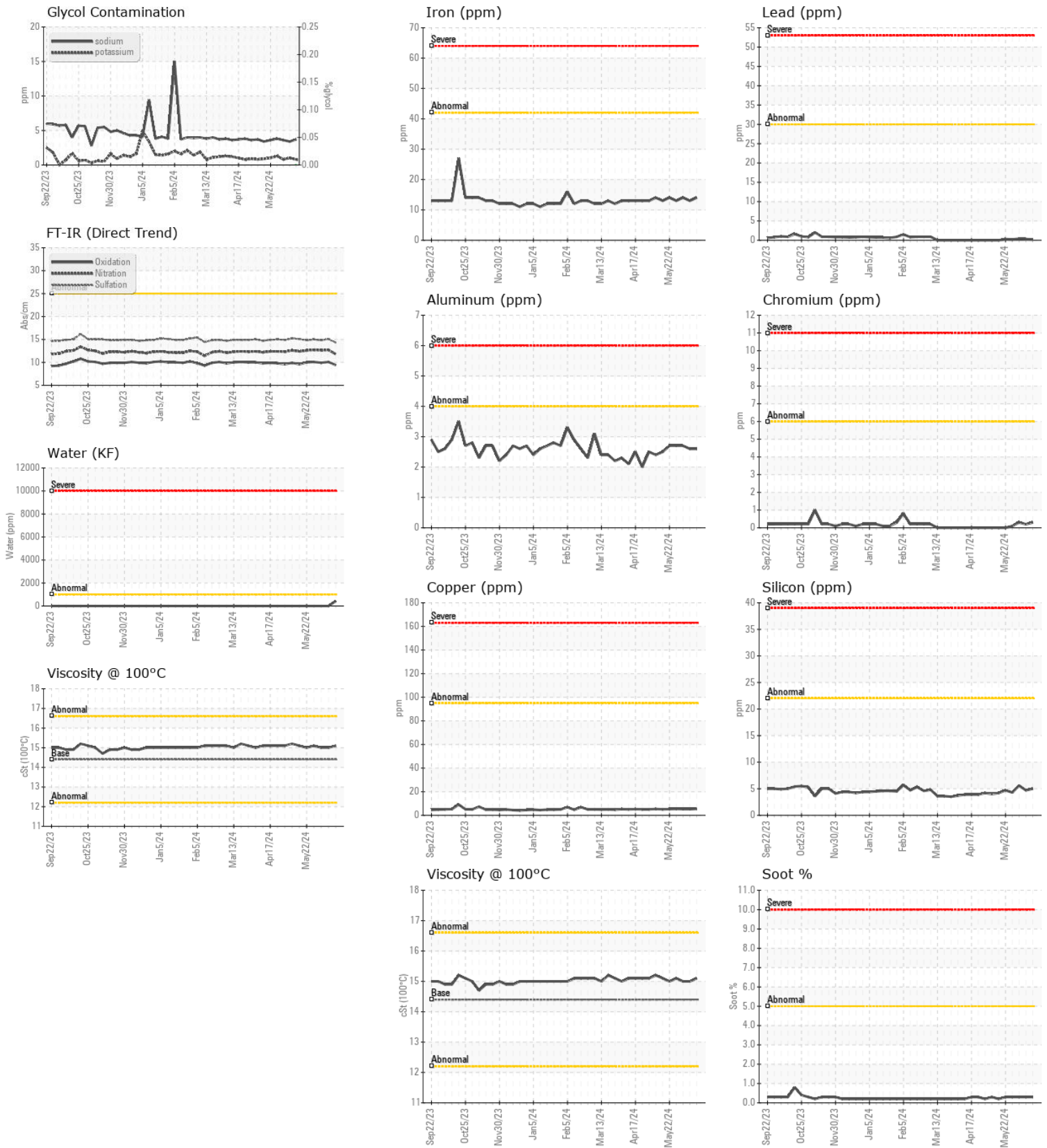
CONTAMINATION

The water content is negligible. There is no indication of any contamination in the oil.

FLUID CONDITION

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

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|------------------|----------|---------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | WC0938516 | WC0938510 | WC0938525 |
| Sample Date | | Client Info | | 20 Jun 2024 | 12 Jun 2024 | 10 Jun 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 |
| <hr/> | | | | | | |
| Iron | ppm | ASTM D5185(m) | >42 | 14 | 13 | 14 |
| Chromium | ppm | ASTM D5185(m) | >6 | <1 | <1 | <1 |
| Nickel | ppm | ASTM D5185(m) | >2 | <1 | <1 | <1 |
| Titanium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| Silver | ppm | ASTM D5185(m) | >5 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185(m) | >4 | 3 | 3 | 3 |
| Lead | ppm | ASTM D5185(m) | >30 | <1 | <1 | <1 |
| Copper | ppm | ASTM D5185(m) | >95 | 6 | 5 | 5 |
| Tin | ppm | ASTM D5185(m) | >10 | <1 | <1 | <1 |
| Vanadium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| <hr/> | | | | | | |
| Silicon | ppm | ASTM D5185(m) | >22 | 5 | 5 | 6 |
| Potassium | ppm | ASTM D5185(m) | >20 | <1 | 1 | <1 |
| Fuel | | WC Method | >4.0 | <1.0 | <1.0 | <1.0 |
| Water | % | ASTM D6304* | >0.1 | 0.042 | --- | --- |
| ppm Water | ppm | ASTM D6304* | >1000 | 426 | --- | --- |
| Glycol | % | ASTM D7922* | | 0.0 | NEG | NEG |
| Soot % | % | ASTM D7844* | | 0.3 | 0.3 | 0.3 |
| Nitration | Abs/cm | ASTM D7624* | >20 | 11.8 | 12.7 | 12.6 |
| Sulfation | Abs/.1mm | ASTM D7415* | >30 | 14.3 | 15.1 | 14.8 |
| Emulsified Water | scalar | Visual* | >0.1 | .5% | NEG | NEG |
| <hr/> | | | | | | |
| Sodium | ppm | ASTM D5185(m) | | 4 | 3 | 4 |
| Boron | ppm | ASTM D5185(m) | 10 | <1 | <1 | 1 |
| Barium | ppm | ASTM D5185(m) | 10 | 0 | 0 | <1 |
| 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 | 17 |
| Calcium | ppm | ASTM D5185(m) | 4500 | 4647 | 4577 | 4815 |
| Phosphorus | ppm | ASTM D5185(m) | 10 | 3 | 3 | 5 |
| Zinc | ppm | ASTM D5185(m) | 10 | 4 | 4 | 5 |
| Sulfur | ppm | ASTM D5185(m) | 5000 | 2881 | 2898 | 2961 |
| Oxidation | Abs/.1mm | ASTM D7414* | >25 | 9.4 | 10.1 | 9.9 |
| Visc @ 100°C | cSt | ASTM D7279(m) | 14.4 | 15.1 | 15.0 | 15.0 |



ISO 17025:2017
Accredited
Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0938516
Lab Number : 02644568
Unique Number : 5802107
Test Package : MOB 1 (Additional Tests: Glycol, KF)

Received : 28 Jun 2024
Tested : 02 Jul 2024
Diagnosed : 02 Jul 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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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.