



OIL ANALYSIS REPORT

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

Area
Store 9 - Marietta

Machine Id
1120

Component
Diesel Engine

Fluid
SHELL ROTELLA T 15W40 (--- GAL)

RECOMMENDATION

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | LEC0048274 | LEC0045457 | LEC0046180 |
| Sample Date | | Client Info | | 06 Mar 2024 | 19 Jan 2024 | 11 Dec 2023 |
| Machine Age | mls | Client Info | | 460912 | 447108 | 434989 |
| Oil Age | mls | Client Info | | 10000 | 10000 | 10000 |
| Filter Age | mls | Client Info | | 10000 | 10000 | 10000 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Filter Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | ABNORMAL | ABNORMAL | ABNORMAL |

WEAR

The lead level is abnormal. All other component wear rates are normal.

| | | | | | | |
|--------------|--------|-------------|------|--------------|------|------|
| Iron | ppm | ASTM D5185m | >100 | 21 | 17 | 17 |
| Chromium | ppm | ASTM D5185m | >20 | 0 | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | 0 | <1 | <1 |
| Titanium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Silver | ppm | ASTM D5185m | >3 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | 3 | 3 | 5 |
| Lead | ppm | ASTM D5185m | >40 | ▲ 157 | ▲ 94 | ▲ 93 |
| Copper | ppm | ASTM D5185m | >330 | 30 | 29 | 29 |
| Tin | ppm | ASTM D5185m | >15 | 2 | 2 | 2 |
| Vanadium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |

CONTAMINATION

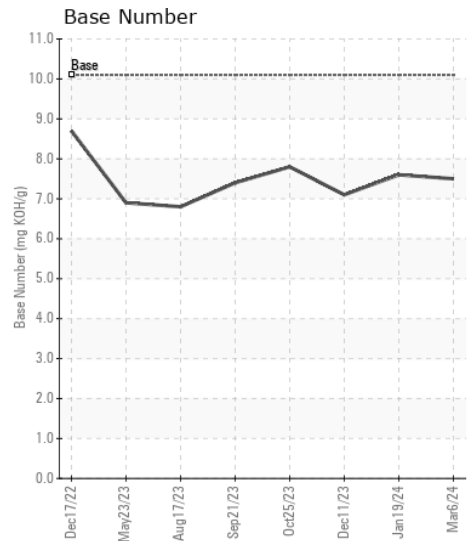
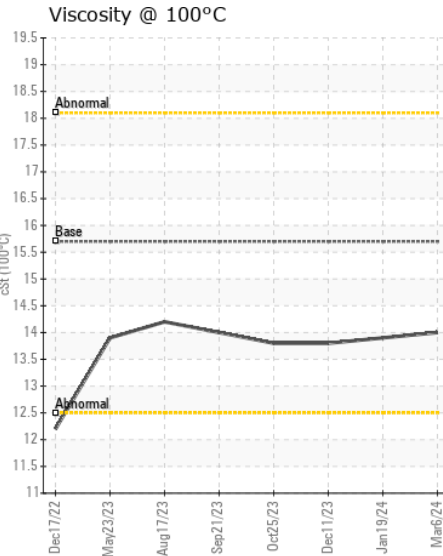
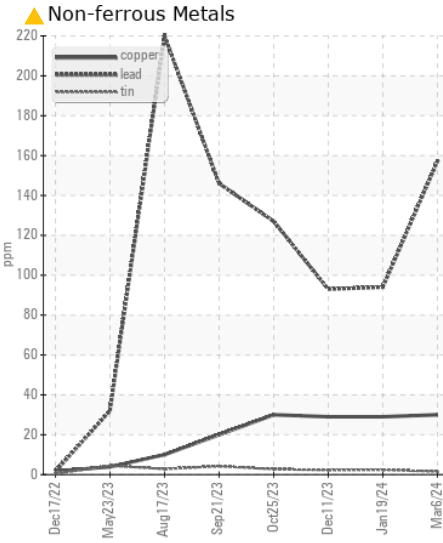
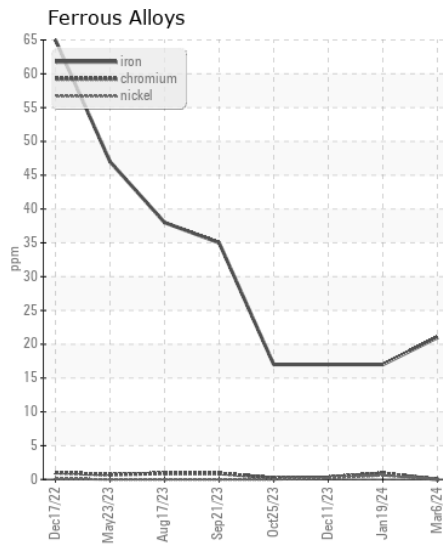
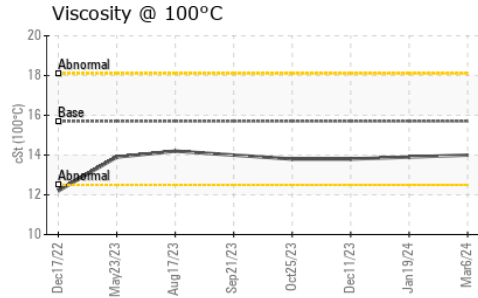
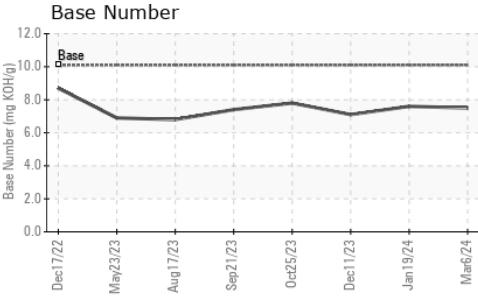
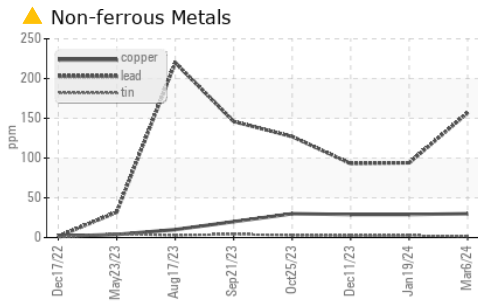
There is no indication of any contamination in the oil.

| | | | | | | |
|------------------|----------|-------------|-------|----------------|-------|-------|
| Silicon | ppm | ASTM D5185m | >120 | 6 | 8 | 6 |
| Potassium | ppm | ASTM D5185m | >20 | 1 | 2 | 2 |
| Fuel | | WC Method | >5 | <1.0 | <1.0 | <1.0 |
| Water | | WC Method | >0.2 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| Soot % | % | *ASTM D7844 | >3 | 0.8 | 0.7 | 0.6 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 10.5 | 10.4 | 10.1 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 26.5 | 26.3 | 25.9 |
| 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 | >0.2 | NEG | NEG | NEG |

FLUID CONDITION

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

| | | | | | | |
|------------------|----------|-------------|------|-------------|------|------|
| Sodium | ppm | ASTM D5185m | | 1 | 0 | <1 |
| Boron | ppm | ASTM D5185m | 316 | 185 | 220 | 216 |
| Barium | ppm | ASTM D5185m | 0.0 | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | 1.2 | 131 | 135 | 145 |
| Manganese | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | 24 | 709 | 686 | 691 |
| Calcium | ppm | ASTM D5185m | 2292 | 1750 | 1485 | 1608 |
| Phosphorus | ppm | ASTM D5185m | 1064 | 812 | 751 | 771 |
| Zinc | ppm | ASTM D5185m | 1160 | 1005 | 910 | 924 |
| Sulfur | ppm | ASTM D5185m | 4996 | 3058 | 2502 | 2587 |
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 21.0 | 21.0 | 20.7 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 10.1 | 7.5 | 7.6 | 7.1 |
| Visc @ 100°C | cSt | ASTM D445 | 15.7 | 14.0 | 13.9 | 13.8 |



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : LEC0048274 **Received** : 20 Mar 2024
Lab Number : 06123332 **Tested** : 21 Mar 2024
Unique Number : 10937483 **Diagnosed** : 22 Mar 2024 - Don Baldrige
Test Package : CONST (Additional Tests: TBN)

HALL DRILLING LLC
 PO BOX 249
 ELLENBORO, WV
 US 26346

Contact: CHRIS PETROVICH
 chrispetrovich@halldrilling.com

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)

T: (304)869-3404
 F: (304)869-3408