



OIL ANALYSIS REPORT

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



Machine Id
BELL B45E B93A645EP03408250
Component
Diesel Engine
Fluid
SHELL ROTELLA T 15W40 (--- GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | BE0019074 | BE0019073 | BE0019072 |
| Sample Date | | Client Info | | 18 Dec 2023 | 25 Sep 2023 | 07 Jul 2023 |
| Machine Age | hrs | Client Info | | 1407 | 955 | 490 |
| Oil Age | hrs | Client Info | | 0 | 0 | 0 |
| Filter Age | hrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | | Client Info | | Changed | Changed | Changed |
| Filter Changed | | Client Info | | Changed | Changed | Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |

WEAR

All component wear rates are normal.

| | | | | | | |
|--------------|--------|-------------|------|--------------|------|------|
| PQ | | ASTM D8184 | >79 | 13 | 13 | 14 |
| Iron | ppm | ASTM D5185m | >100 | 18 | 17 | 23 |
| Chromium | ppm | ASTM D5185m | >20 | 1 | 2 | 2 |
| Nickel | ppm | ASTM D5185m | >4 | <1 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Silver | ppm | ASTM D5185m | >3 | 0 | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | 5 | 7 | 10 |
| Lead | ppm | ASTM D5185m | >40 | <1 | <1 | 0 |
| Copper | ppm | ASTM D5185m | >330 | 26 | 78 | 422 |
| Tin | ppm | ASTM D5185m | >15 | <1 | 1 | 2 |
| Vanadium | ppm | ASTM D5185m | | <1 | 0 | 0 |
| White Metal | scalar | *Visual | NONE | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE | NONE |

CONTAMINATION

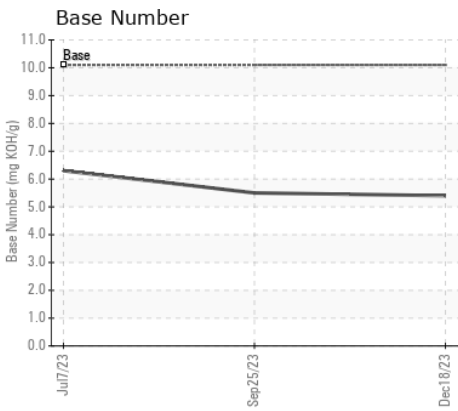
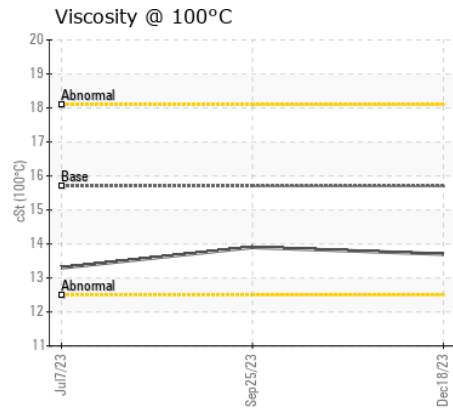
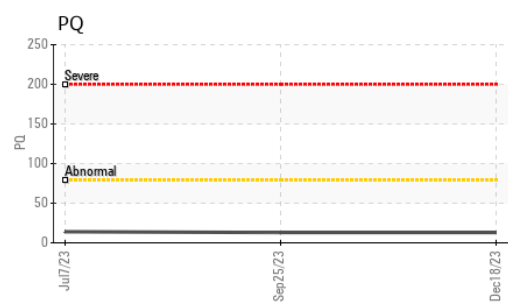
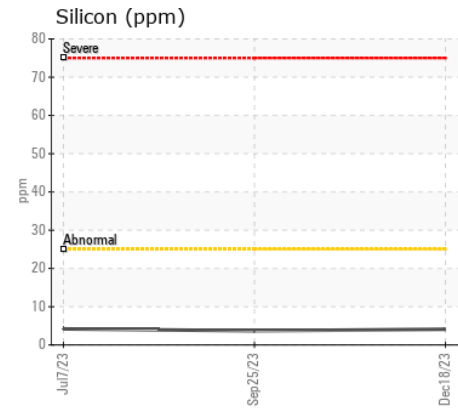
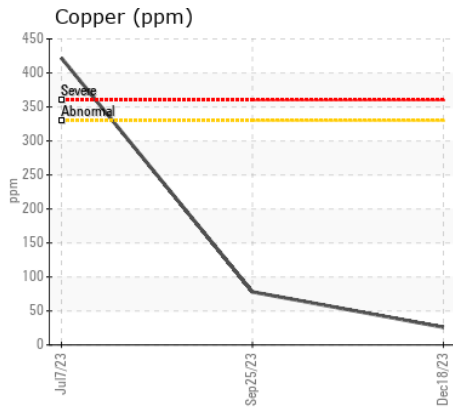
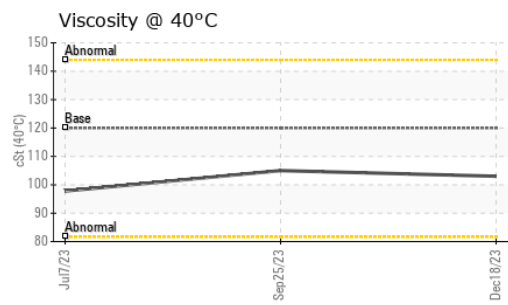
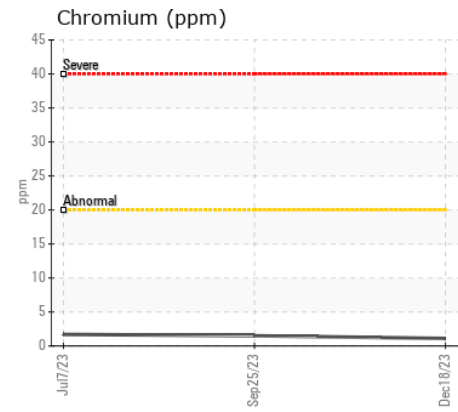
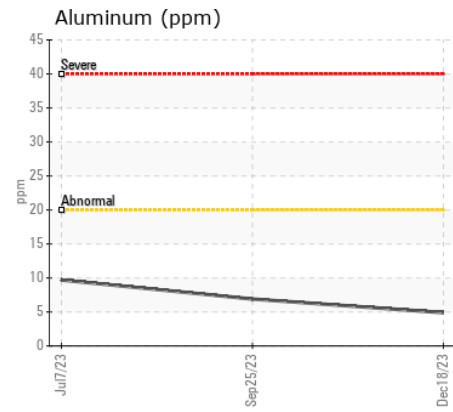
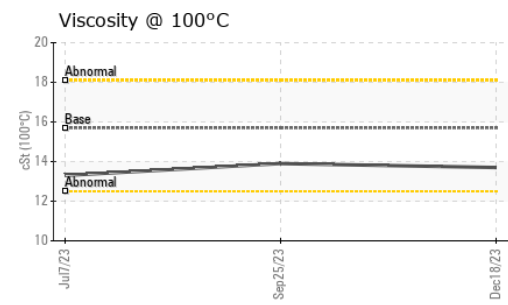
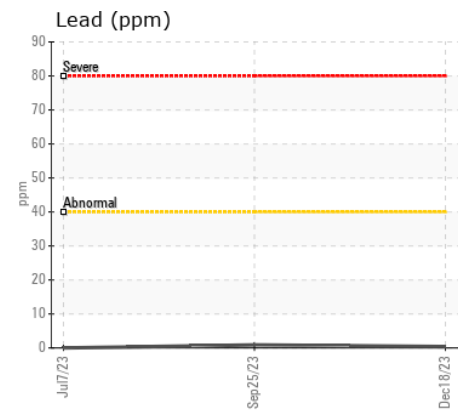
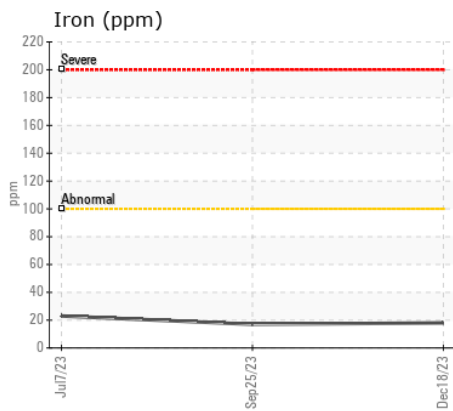
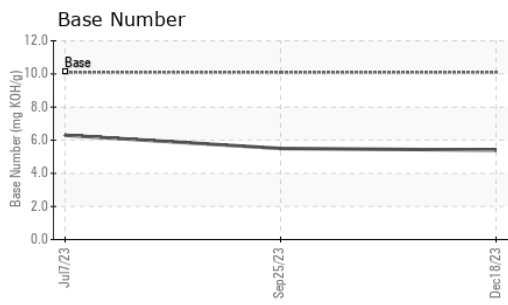
There is no indication of any contamination in the oil.

| | | | | | | |
|------------------|----------|-------------|-------|----------------|-------|-------|
| Silicon | ppm | ASTM D5185m | >25 | 4 | 4 | 4 |
| Potassium | ppm | ASTM D5185m | >20 | 9 | 18 | 21 |
| 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 | 0.6 | 0.7 | 0.5 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 9.2 | 9.1 | 8.8 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 21.1 | 21.4 | 20.9 |
| 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 suitable for further service.

| | | | | | | |
|----------------------|----------|-------------|------|--------------|------|------|
| Sodium | ppm | ASTM D5185m | | 1 | 2 | 2 |
| Boron | ppm | ASTM D5185m | 316 | 38 | 34 | 63 |
| Barium | ppm | ASTM D5185m | 0.0 | 0 | 0 | 2 |
| Molybdenum | ppm | ASTM D5185m | 1.2 | 63 | 43 | 26 |
| Manganese | ppm | ASTM D5185m | | <1 | <1 | 2 |
| Magnesium | ppm | ASTM D5185m | 24 | 115 | 112 | 125 |
| Calcium | ppm | ASTM D5185m | 2292 | 1970 | 1946 | 2221 |
| Phosphorus | ppm | ASTM D5185m | 1064 | 871 | 894 | 936 |
| Zinc | ppm | ASTM D5185m | 1160 | 1149 | 1119 | 1166 |
| Sulfur | ppm | ASTM D5185m | 4996 | 2799 | 2790 | 3469 |
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 16.7 | 17.0 | 16.6 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 10.1 | 5.4 | 5.5 | 6.3 |
| Visc @ 40°C | cSt | ASTM D445 | 120. | 103 | 105 | 97.8 |
| Visc @ 100°C | cSt | ASTM D445 | 15.7 | 13.7 | 13.9 | 13.3 |
| Viscosity Index (VI) | Scale | ASTM D2270 | 139 | 133 | 133 | 134 |



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : BE0019074 **Received** : 17 Jan 2024
Lab Number : 06062518 **Diagnosed** : 25 Jan 2024
Unique Number : 10833900 **Diagnostician** : Jonathan Hester
Test Package : MOBCE

Highway Equipment Company
 22035 Perry Highway
 Zelienople, PA
 US 16063
 Contact: James Gibson
 jgibson@highway-equipment.com
 T: (800)222-8798
 F:

Certificate L2367
 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)