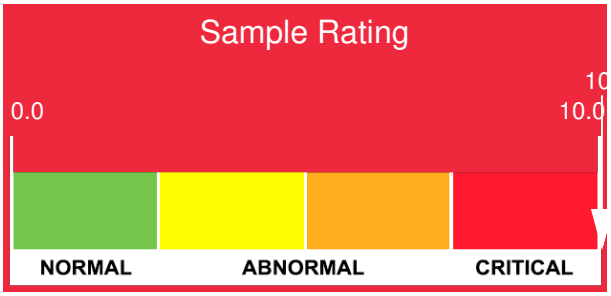
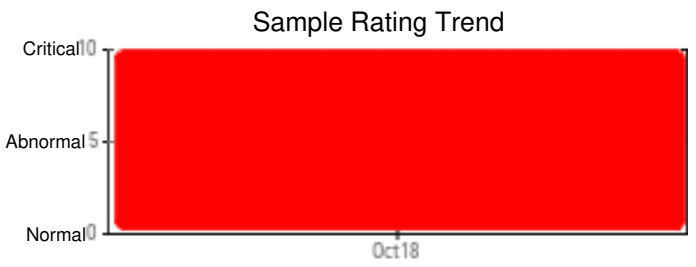


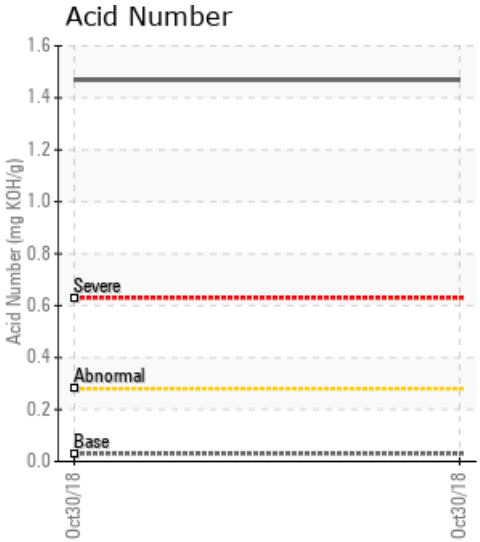

# 6-33-53-12W5

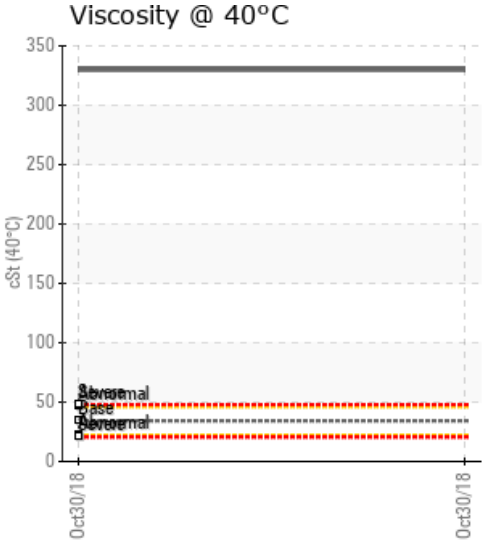
| Customer: PTRHTF20205 | System Information | Sample Information |
|---|---|---|
| TERVITA<br>BOX 38<br>NITON JUCTION, AB T0E 1S0 Canada<br>Attn: John Kirsch<br>Tel: (780)712-3382<br>E-Mail: jkirsch@tervita.com | System Volume: 4000 ltr<br>Bulk Operating Temp: 320F / 160C<br>Heating Source:<br>Blanket:<br>Fluid: PETRO CANADA PETRO-THERM<br>Make: PARKER BOILER | Lab No: 02249080<br>Analyst: Peter Harteveld<br>Sample Date: 10/30/18<br>Received Date: 11/02/18<br>Completed: 04/02/19 |

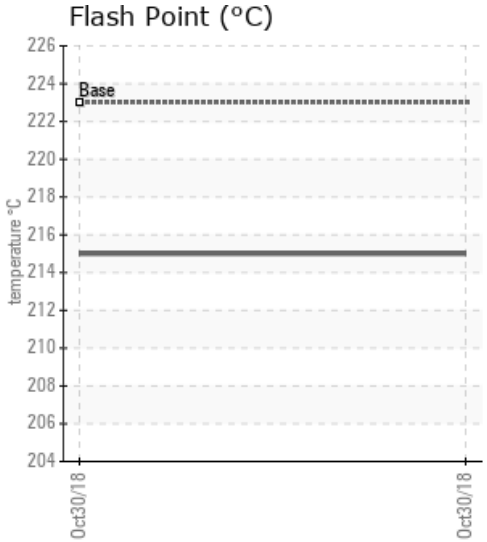
Recommendation: The condition of the fluid is poor. It is recommended to clean the system and replace the fluid. It looks like the fluid is degraded by oxidation. High viscosity, Acid Number and elevated 90% GCD temperature are indications of that. As a result of oxidation the fluid has become acidic which has resulted in corrosion (hence the high Fe content) and a high solids content (drop-out of carbonaceous material). Oxidation of the fluid can be the result of not having blanket gas on the expansion tank. Please verify proper operation of the blanket gas system.

Comments: Iron ppm levels are severe. PQ levels are severe. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally high.

| Sample Date | Received Date | Fluid Age | Sample Location | Flash Point (COC) | Water (KF) | Viscosity (40°C) | Acid Number | Solids | GCD 10% | GCD 50% | GCD 90% | GCD % < 335°C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm/dd/yy | | | °F/°C | ppm | cSt | mg/KOH/g | %wt | °F/°C | °F/°C | °F/°C | % |
| 10/30/18 | 11/02/18 | 0y | | 419 / 215 | 306.4 | 330 | 1.47 | 2.93 | 695 / 368 | 806 / 430 | 925 / 496 | 3.21 |
| Baseline Data | | | | 433 / 223 | | 34.2 | 0.03 | | 720 / 382 | 817 / 436 | 900 / 482 | 1.00 |

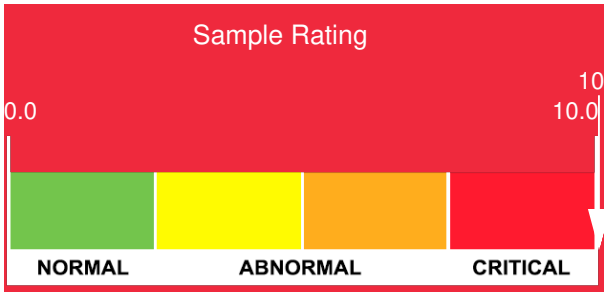


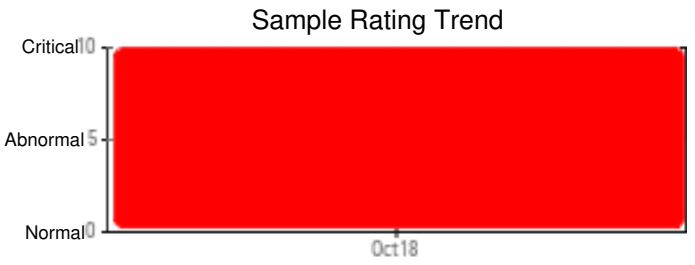



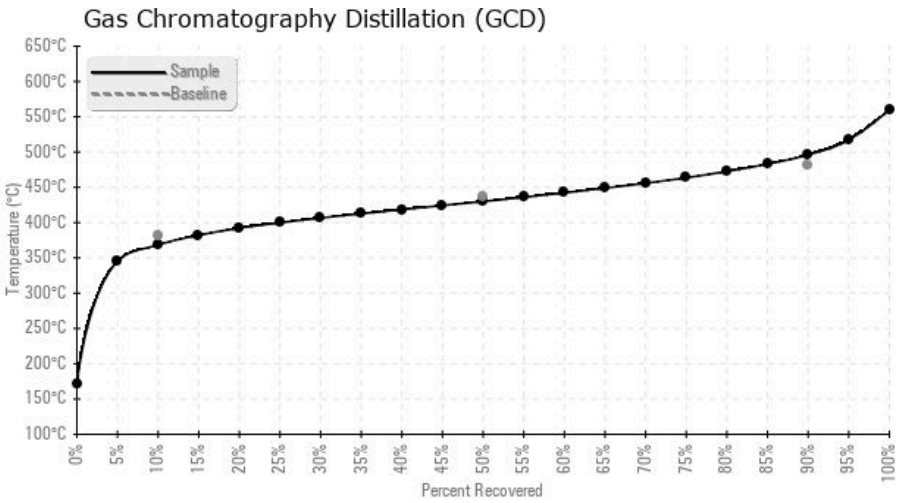
PETRO-CANADA LUBRICANTS

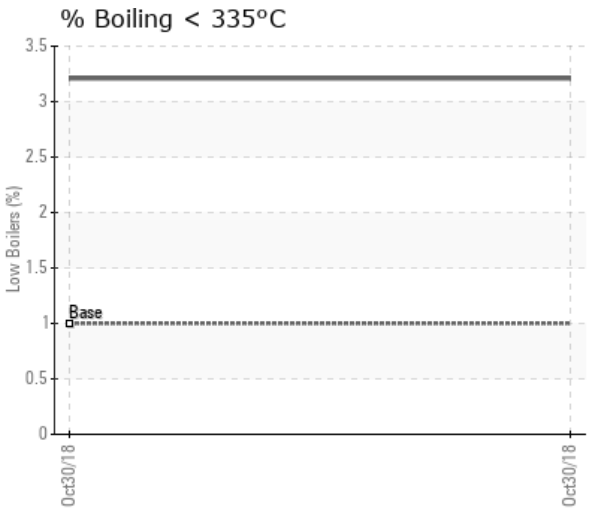



| Sample Date | Iron | Chromium | Nickel | Aluminum | Copper | Lead | Tin | Cadmium | Silver | Vanadium | Silicon | Sodium | Potassium | Titanium | Molybdenum | Antimony | Manganese | Lithium | Boron | Magnesium | Calcium | Barium | Phosphorus | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/30/18 | 1189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 12 | 0 | 1 | 0 | 3 | 0 | 1 | 0 |
| Baseline Data | | | 0 | 0 | | | | | | 0 | | | 0 | 0 | | | | | 0 | | | | 0 | |

Elemental anaysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]




## Historical Comments

| | |
|---|---|
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