

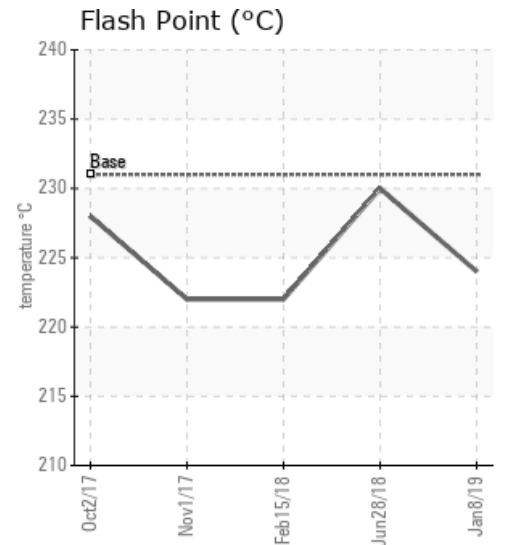
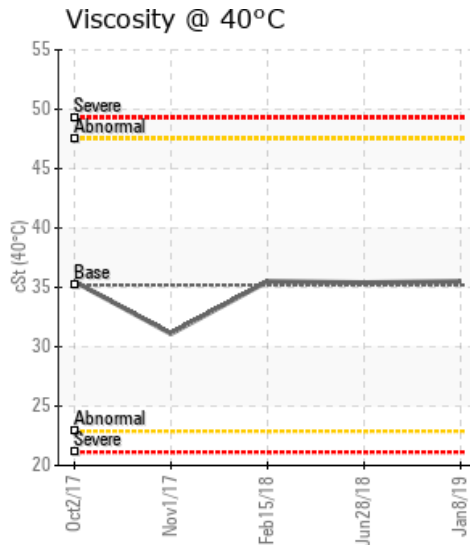
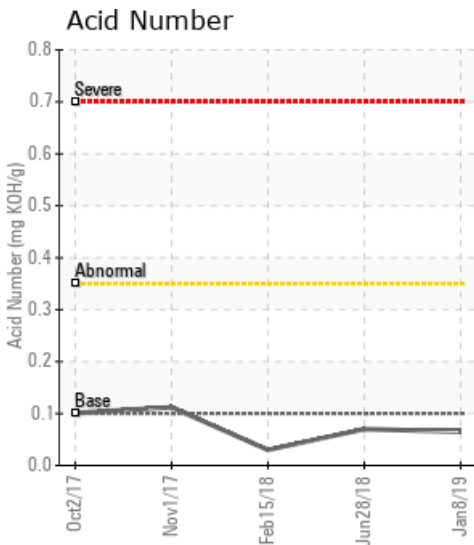
LN01 Filled Sealdown Loop Hot Oil System

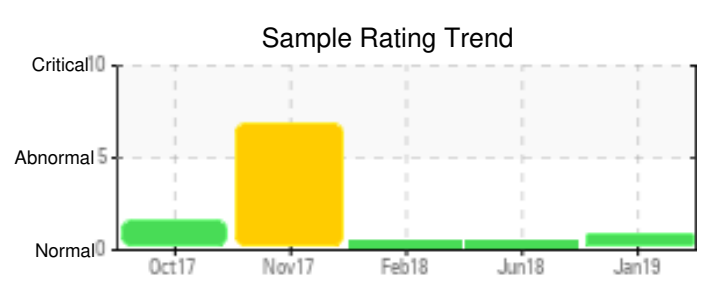
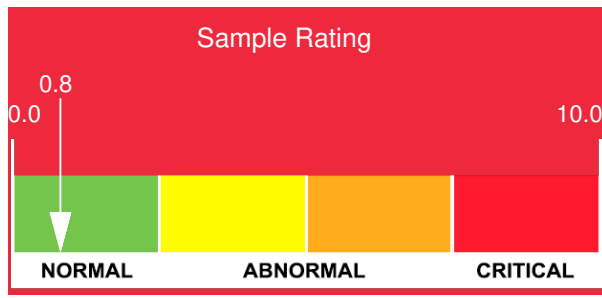
| Customer: PTRHTF10141 | System Information | Sample Information |
|--|---|---|
| TAMKO BUILDING PRODUCTS 2300 35TH ST TUSCALOOSA, AL 35401 USA Attn: Greg Colburn Tel: (205)752-3555 E-Mail: gregory_colburn@tamko.com | System Volume: 110 gal Bulk Operating Temp: 350F / 177C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: Heat Exchanger And T | Lab No: 02262943 Analyst: Jake Finn Sample Date: 01/08/19 Received Date: 01/17/19 Completed: 01/18/19 |

Recommendation: 'Venting' system fluid may increase the distillation point values to desired levels. Fluid is suitable for continued use, please resubmit sample in December 2019.

Comments: (GCD) 90% Distillation Point is abnormally low. (GCD) 90% Distillation Point is abnormally low.

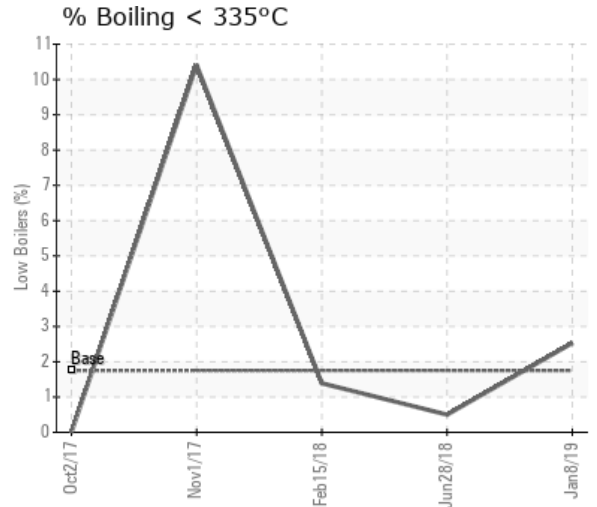
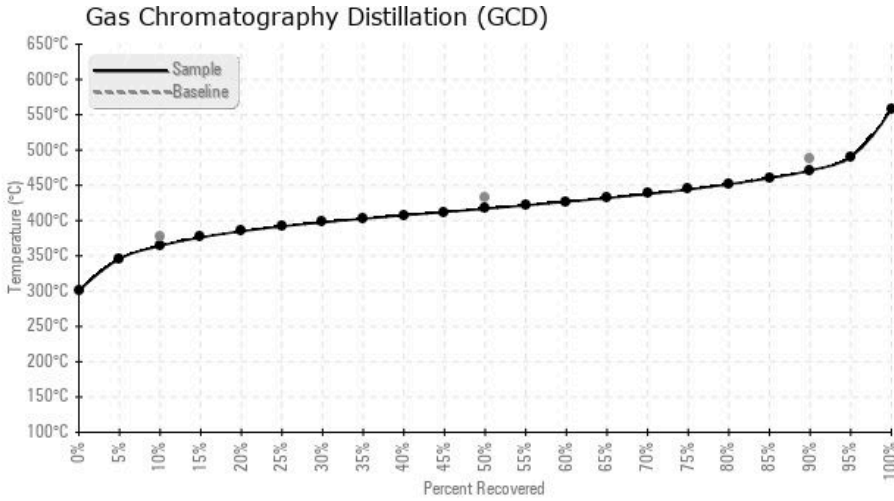
| Sample Date | Received Date | Fluid Age | Sample Location | Flash Point (COC) | Water (KF) | Viscosity (40°C) | Acid Number | Solids | GCD 10% | GCD 50% | GCD 90% | GCD % < 335°C |
|---------------|---------------|-----------|-----------------|-------------------|------------|------------------|-------------|--------|-----------|-----------|-----------|---------------|
| | mm/dd/yy | | | °F/°C | ppm | cSt | mg/KOH/g | %wt | °F/°C | °F/°C | °F/°C | % |
| 01/08/19 | 01/17/19 | 13m | | 435 / 224 | 10.1 | 35.5 | 0.065 | 0.077 | 687 / 364 | 782 / 417 | 880 / 471 | 2.53 |
| 06/28/18 | 07/09/18 | 0m | PORT | 446 / 230 | 13.8 | 35.4 | 0.07 | 0.023 | 724 / 385 | 809 / 432 | 910 / 488 | 0.50 |
| 02/15/18 | 02/22/18 | 9m | | 432 / 222 | 5.4 | 35.5 | 0.03 | 0.017 | 713 / 379 | 808 / 431 | 900 / 482 | 1.39 |
| 11/01/17 | 01/18/18 | 6m | | 432 / 222 | 14.9 | 31.1 | 0.112 | 0.275 | 634 / 334 | 658 / 348 | 778 / 414 | 10.41 |
| 10/02/17 | 10/10/17 | 0m | | 442 / 228 | 9.9 | 35.5 | 0.101 | 0.023 | 740 / 393 | 807 / 431 | 890 / 477 | 0.00 |
| Baseline Data | | | | 448 / 231 | | 35.20 | .1 | | 712 / 378 | 810 / 432 | 910 / 488 | 1.75 |





| 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 |
|----------------------|------|----------|--------|----------|--------|------|-----|---------|--------|----------|---------|--------|-----------|----------|------------|----------|-----------|---------|-------|-----------|---------|--------|------------|------|
| 01/08/19 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 188 | 0 |
| 06/28/18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 |
| 02/15/18 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 202 | 0 |
| 11/01/17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/02/17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 0 |
| Baseline Data | | | 0 | 0 | | | | | | 0 | | | 0 | 0 | | | | | 0 | | | | 280 | |

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



Historical Comments

| | |
|----------|---|
| 06/28/18 | Fluid is suitable for continued use. Please re-submit next sample in June 2019. Some very light debris was noticed. Change any system filters regularly or tighten up the micron levels for a cleaner fluid. This fluid can be polished using a 2-stage kidney loop system safely during any shutdown periods. |
| 02/15/18 | Fluid is suitable for continued use. Improvements over the previous sample submitted 3.5 months earlier are noticeable. There was an increase in visible 'debris' although the color of the fluid is much clearer than before. If possible, filtering this fluid will assist in maintaining cleanliness or changing any system filters. |
| 11/01/17 | This sample has significantly changed negatively since the previous sample 1 month prior. This fluid may be a candidate for a drain, flush and fill with virgin Calflo HTF only because of the rate of change noticed between samples. Pentane Insolubles have increased from .02 to .2 which is a big leap in the 'solids' found in the oil. Oil oxidation may be occurring as witnessed in the severe increase in the distillation curve <335°C (GCD) 50% Distillation Point is severely low. (GCD) 90% Distillation Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high. |
| 10/02/17 | The distillation points may be mitigated by 'venting' the heat transfer system. Oil is suitable for continued use. Please send any samples in immediately after any maintenance has been completed to rectify the distillation points. Wear Metals are satisfactory; Contamination levels are in check; Water is low at 9.9ppm; Acid number is low; Viscosity of the fluid is satisfactory at 35.5 Cst; COC Flash Point is good; (GCD) 10% Distillation Point is marginally high. (GCD) 90% Distillation Point is marginally low. Pentane insolubles are low; No visible debris detected. |

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