

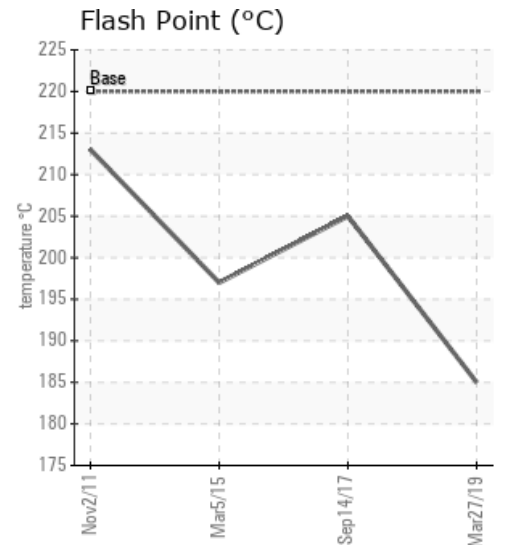
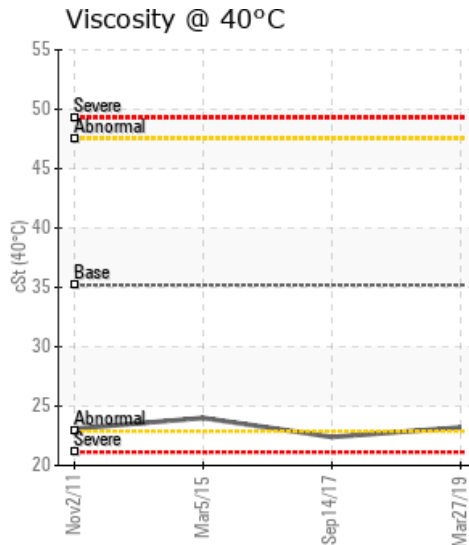
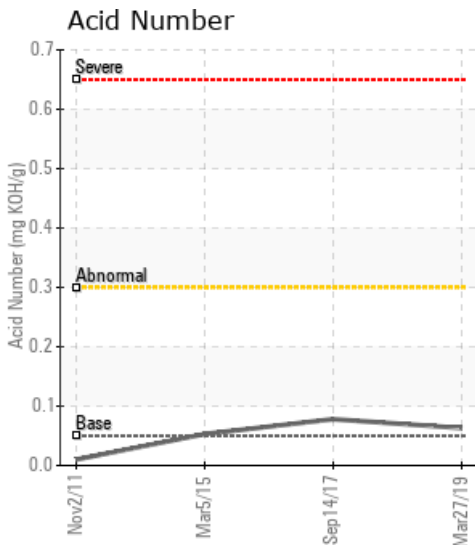
## HEAT TRANSFER SYSTEM

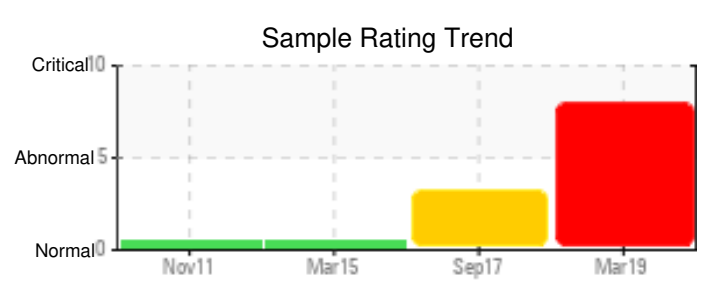
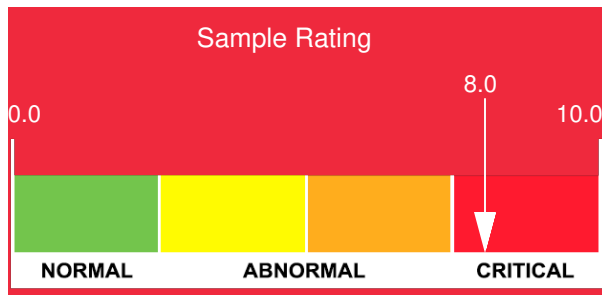
| Customer: PTRHTF40093  | System Information   | Sample Information   |
|--|--|--|
| VISHANDEL ALMELO<br>AM BACHTSWEG 8<br>KATWIJK, 2222AK Netherlands<br>Attn: WILBERT SNIJERS<br>Tel:<br>E-Mail: w.snijers@klt.nl | System Volume: 1200 ltr<br>Bulk Operating Temp: 260F / 127C<br>Heating Source:<br>Blanket:<br>Fluid: SHELL THERMIA B<br>Make: WANSON | Lab No: 02276860<br>Analyst: Philip Riley<br>Sample Date: 03/27/19<br>Received Date: 04/02/19<br>Completed: 04/16/19 |

Recommendation: Not a Petro-Canada product so cannot diagnose competitor fluid on chemistry. Copper looks to be increasing which could increase probability of oxidation of the fluid. Flash point and 90% Dist tracking down indicating end of fluid life

Comments: Copper ppm levels are severe. (GCD) 90% Distillation Point is severely low. COC Flash Point is marginally low.

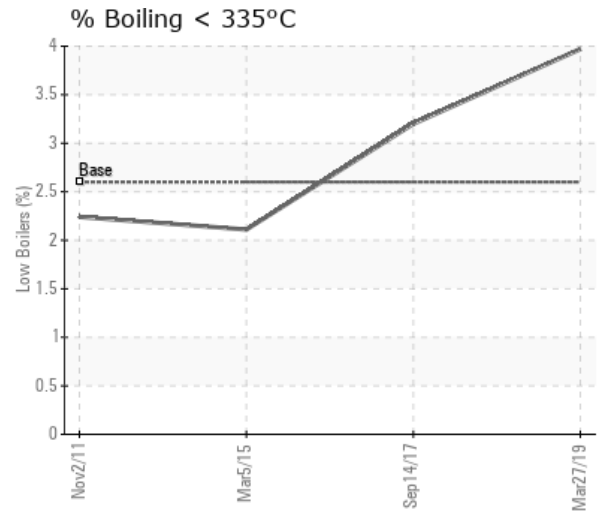
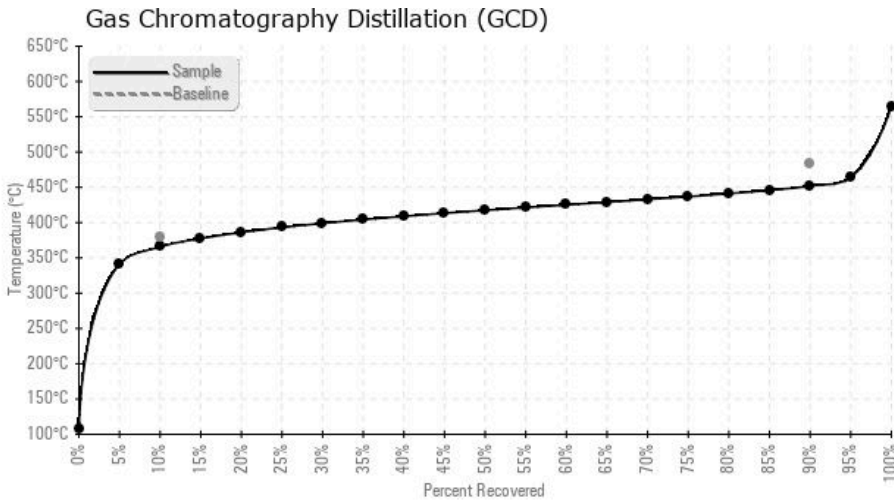
| Sample Date   | Received Date | Fluid Age | Sample Location | Flash Point (COC) | Water (KF) | Viscosity (40°C) | Acid Number | Solids | GCD 10%   | GCD 50%   | GCD 90%   | GCD % < 335°C |
|---------------|---------------|-----------|-----------------|-------------------|------------|------------------|-------------|--------|-----------|-----------|-----------|---------------|
|               | mm/dd/yy      |           |                 | °F/°C             | ppm        | cSt              | mg/KOH/g    | %wt    | °F/°C     | °F/°C     | °F/°C     | %             |
| 03/27/19      | 04/02/19      | 20y       |                 | 365 / 185         | 20.1       | 23.2             | 0.063       | 0.022  | 690 / 366 | 783 / 417 | 846 / 452 | 3.97          |
| 09/14/17      | 09/22/17      | 18y       |                 | 401 / 205         | 16.4       | 22.4             | 0.078       | 0.051  | 698 / 370 | 791 / 422 | 851 / 455 | 3.20          |
| 03/05/15      | 03/12/15      | 16y       |                 | 387 / 197         | 25.1       | 24.0             | 0.053       | 0.073  | 744 / 396 | 839 / 449 | 904 / 484 | 2.11          |
| 11/02/11      | 11/07/11      |           | NA              | 415 / 213         | 15         | 23.1             | 0.01        | 0.006  | 708 / 376 | 790 / 421 | 849 / 454 | 2.241         |
| Baseline Data |               |           |                 | 428 / 220         |            | 35.2             | 0.05        |        | 714 / 379 |           | 903 / 484 | 2.60          |





| 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 |
|---------------|------|----------|--------|----------|--------|------|-----|---------|--------|----------|---------|--------|-----------|----------|------------|----------|-----------|---------|-------|-----------|---------|--------|------------|------|
| 03/27/19      | 10   | 0        | 0      | 0        | 65     | 2    | 0   | 0       | 0      | 0        | 0       | 0      | 0         | 0        | 0          | 0        | 0         | 0       | 0     | 0         | 0       | 0      | 0          | 0    |
| 09/14/17      | 6    | 0        | 0      | 0        | 51     | 2    | 0   | 0       | 0      | 0        | 0       | 0      | 0         | 0        | 0          | 0        | 0         | 0       | 0     | 0         | 0       | 0      | 0          | 0    |
| 03/05/15      | 4    | 0        | 0      | 0        | 26     | 0    | 0   | 0       | 0      | 0        | 0       | 0      | 0         | 0        | 0          | 0        | 0         | 0       | 0     | 0         | 0       | 0      | 0          | 0    |
| 11/02/11      | 2    | 0        | 0      | 0        | 18     | 0    | 1   | 0       | 0      | 0        | 5       | 0      | 0         | 0        | 0          | 0        | 0         | 0       | 4     | 0         | 5       | 1      | 3          | 5    |
| Baseline Data |      |          | 0      | 0        |        |      |     |         |        | 0        |         |        | 0         | 0        |            |          |           |         | 0     |           |         |        | 0          |      |

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



| Historical Comments |   |
|---------------------|---|
| 09/14/17            | Viscosity is reduced. Cu level has increased significantly since the last analysis. Consider checking yellow metal components for corrosion and wear or hard deposits. Copper ppm levels are abnormal.  |
| 03/05/15            | Oil appears to be in good condition. A slight rise in Copper content but considering the age of this fluid and the overall condition of the fluid which is good and fit for further service. Suggest sample at next scheduled maintenance interval. Please confirm what fluid this is. Copper ppm levels are abnormal. (GCD) 10% Distillation Point is marginally high. |
| 11/02/11            | No Comments   |

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