

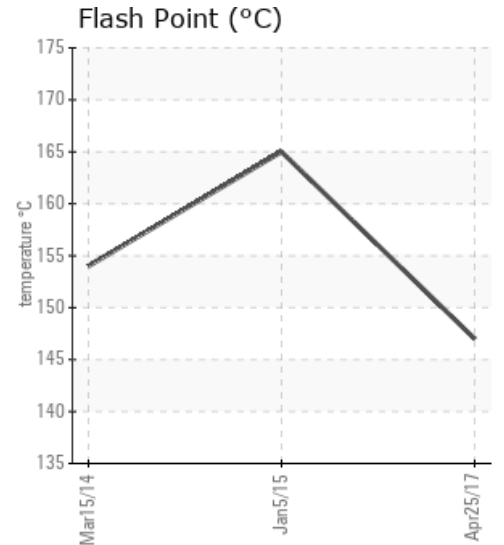
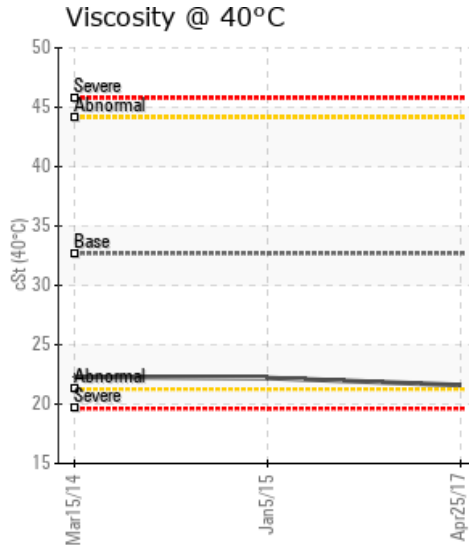
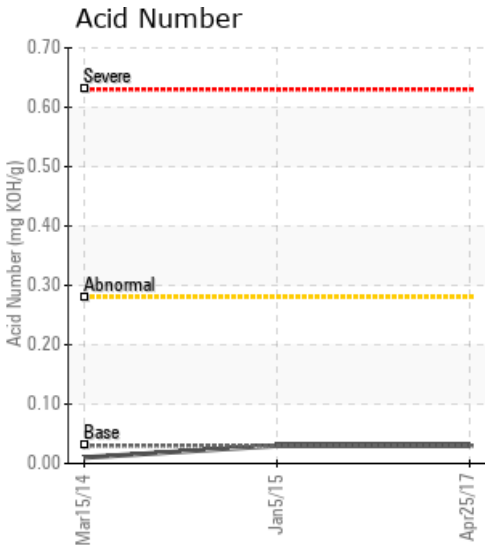
AUTOLIV BOILER #2

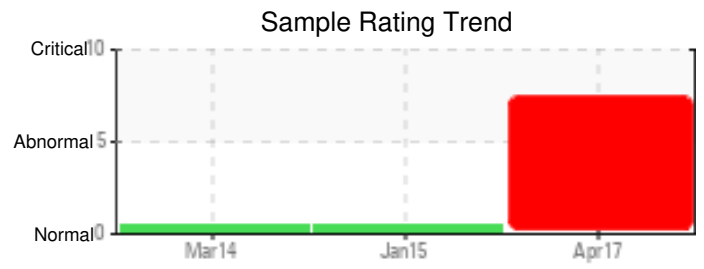
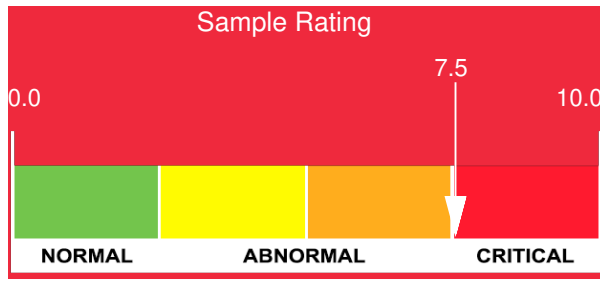
| Customer: PTRHTF30004 | System Information | Sample Information |
|--|---|--|
| AUTOLIV CANADA 20 AUTOLIV DRIVE P.O. BOX 1090 TILBURY, ON N0P 2L0 Canada Attn: Jill Stevenson Tel: (519)682-1083 E-Mail: | System Volume: 4000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: VAPOUR POWER | Lab No: 02147901 Analyst: Behshad Sabah Sample Date: 04/25/17 Received Date: 05/26/17 Completed: 05/30/17 Behshad Sabah behshad.sabah@HFSinclair.com |

Recommendation: Viscosity of the Calflo AF has been reduced to 21.6 cSt @40°C from a typical of 32.3 cSt @ 40°C. Possible cracking of the fluid has occurred, or another product has been added. Percent of boilers <335°C is quite high @ 13.80% and 10% point has been reduced to 313.5°C from a typical of 365°C. Consider venting system to reduce light boilers. Consider bleeding off some fluid and sweetening with Calflo AF to increase viscosity of fluid. Sulphur and Phosphorus additive levels are not consistent with Calflo AF. Confirm that Calflo AF is being used and topped up. Resample at 3 months after venting to confirm if low boilers have been reduced. Consider bleeding off some fluid and sweetening with Calflo AF to increase flash point and reduce low boilers.

Comments: (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 335°C is abnormally 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 | % |
| 04/25/17 | 05/26/17 | 7.0y | | 297 / 147 | 6.8 | 21.6 | 0.03 | 0.208 | 595 / 313 | 775 / 413 | 888 / 476 | 14.09 |
| 01/05/15 | 01/13/15 | 6.0y | | 329 / 165 | 40.2 | 22.2 | 0.03 | 0.060 | 601 / 316 | 778 / 415 | 885 / 474 | 13.24 |
| 03/15/14 | 01/13/15 | 5.0y | | 309 / 154 | 16.4 | 22.3 | 0.01 | 0.079 | 604 / 318 | 781 / 416 | 908 / 487 | 13.09 |
| Baseline Data | | | | 435 / 224 | | 32.7 | 0.03 | | 693 / 367 | 790 / 421 | 887 / 475 | 2.5 |

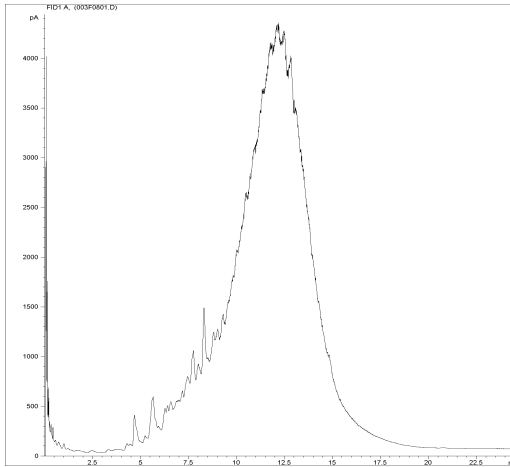




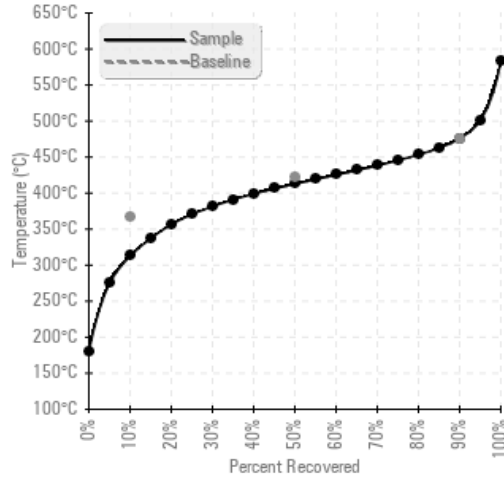
| Sample Date | Iron | Chromium | Nickel | Aluminum | Copper | Lead | Tin | Cadmium | Silver | Vanadium | Silicon | Sodium | Potassium | Titanium | Molybdenum | Antimony | Manganese | Lithium | Boron | Magnesium | Calcium | Barium | Phosphorus | Zinc | |
|---------------|------|----------|--------|----------|--------|------|-----|---------|--------|----------|---------|--------|-----------|----------|------------|----------|-----------|---------|-------|-----------|---------|--------|------------|------|---|
| 04/25/17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 0 | |
| 01/05/15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 0 |
| 03/15/14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 0 |
| Baseline Data | | | 0 | 0 | | | | | | 0 | | | 0 | 0 | | | | | 0 | | | | | 270 | |

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

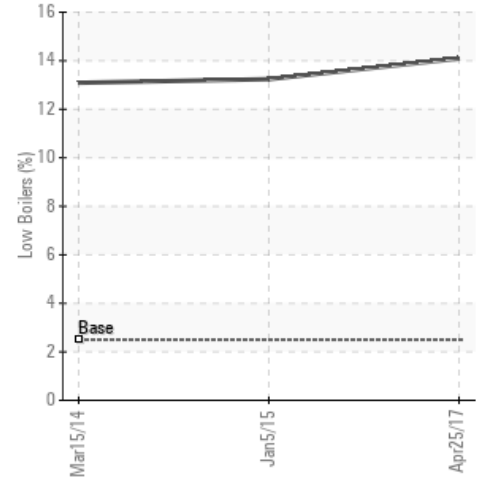
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

| | |
|----------|---|
| 01/05/15 | There is an indication of thermal cracking as the oil seems to have abnormal high light ends. If it is possible to vent the light ends out of the system through the expansion tank, then I would suggest that this be done. I would suggest tha we re-sample the oil in this unit. It is about the same as the sample from 3/5/2014 (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is abnormally high. COC Flash Point is abnormally low. |
| 03/15/14 | There is an indication of thermal cracking as the oil seems to have abnormal high light ends. If it is possible to vent the light ends out of the system through the expansion tank, then I would suggest that this be done. I would suggest tha we re-sample the oil in this unit COC Flash Point is severely low. (GCD) % < 335°C is abnormally high. (GCD) 10% Distillation Point is abnormally low. (GCD) 90% Distillation Point is marginally high. |
| | |
| | |

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