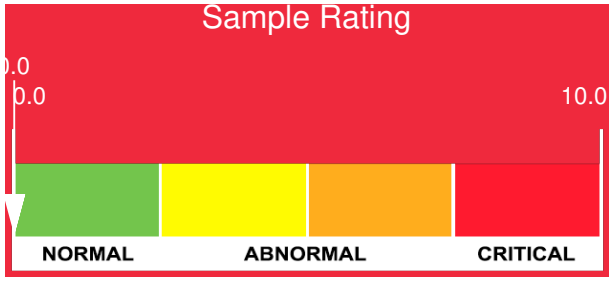
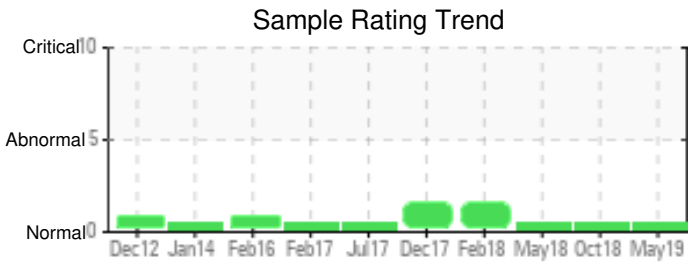




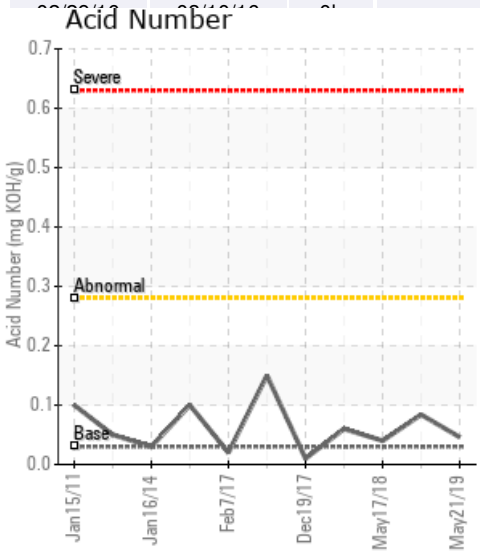
MODIFIED ROOM

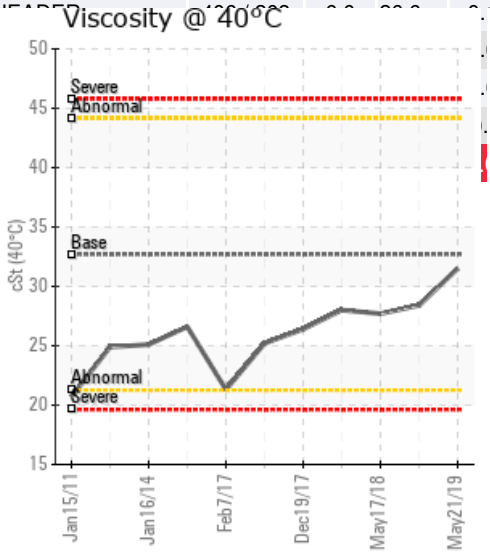
Customer: PTRHTF10059	System Information	Sample Information
CERTAINTEED - SAINT GOBAIN 11519 US RT 250 N MILAN, OH 44846 USA Attn: DAVE BLAKELY Tel: (419)541-0843 E-Mail: dave.l.blakely@saint-gobain.com	System Volume: 320 gal Bulk Operating Temp: 480F / 249C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: FIRST THERMOL	Lab No: 02288396 Analyst: Gaston Arseneault Sample Date: 05/21/19 Received Date: 05/31/19 Completed: 06/03/19

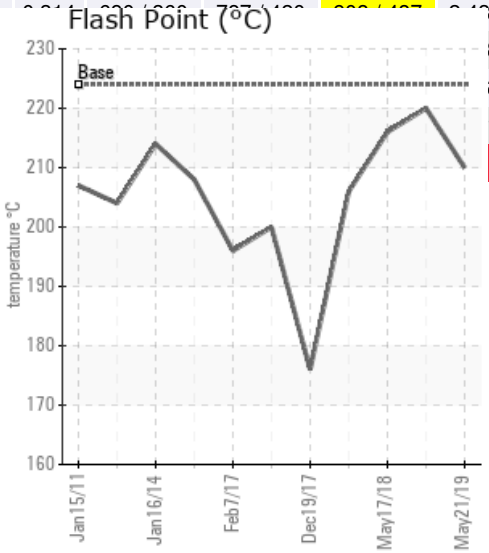
Recommendation: Everything looks good, the fluid condition is great and degradation and contamination are not detected.

Comments:

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	%
05/21/19	05/31/19	0h		410 / 210	9.2	31.5	0.046	0.008	687 / 364	790 / 421	898 / 481	1.77
10/11/18	10/24/18	0h		428 / 220	16.4	28.4	0.084	0.066	689 / 365	785 / 418	876 / 469	0.69
05/17/18	05/24/18	0h	LINE1 COATER RETURN	421 / 216	7.4	27.7	0.04	0.044	676 / 358	757 / 403	873 / 467	0.00
02/28/18	03/13/18	0h		403 / 206	8.0	28.0	0.06	0.107	688 / 364	792 / 422	895 / 480	1.74
12/19/17	01/11/18	0h		349 / 176	12.5	26.4	0.01	0.010	681 / 361	769 / 409	864 / 462	0.00
07/09/17	07/28/17	0h		392 / 200	19.7	25.2	0.15	0.032	678 / 359	780 / 416	881 / 472	2.50
02/07/17	02/15/17	0h	SIDE STREAM FLTR PRT	385 / 196	11.7	21.3	0.02	0.030	678 / 359	779 / 415	883 / 473	2.20







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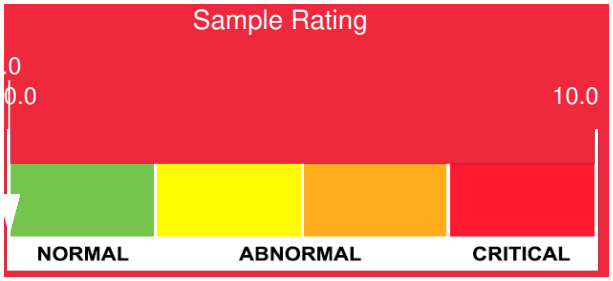
PETRO-CANADA LUBRICANTS



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
05/21/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0
10/11/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0
05/17/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0
02/28/18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	0
12/19/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0
07/09/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	34	0
02/07/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0
02/29/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	0
01/16/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0
12/10/12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
01/15/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0
Baseline Data			0	0						0			0	0					0				270	

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

Historical Comments	
10/11/18	The condition looks good overall and we see no action needed at this time besides resampling in 6 months.
05/17/18	The last recommendation was to vent some of the low boilers out of the system. We're not sure if this was done but the flash point increased slightly. The condition looks good and we see no action needed at this time besides re-sampling in 6 months.
02/28/18	The viscosity improved a bit and judging by the increase in phosphorous we can conclude it's because some oil was added. The flash point improved too. Keep monitoring this fluid as we do not see any action items at this point
12/19/17	The flash point is low and the Simulated distillation indicates the presence of low boilers or molecules boiling before the boiling point of fresh oil which are the results you will see if there is thermal degradation of the fluid. Recommendation is to try and remove the low boilers by venting of the expansion tank if it is safe to due so and add new oil to the system to help raise the flash point about 15% - 20 % resample in 3 - 6 months to see how the system responded.
07/09/17	Viscosity has stabilized from last sample flash point in acceptable ranges, fluid appears to be free of contamination and does not appear to have degraded from last samples. Re sample in 6 months to verify fluid condition.
02/07/17	The viscosity of the fluid has dropped by 20% from the last sample a year ago. The flash point remains strong however. The overall condition looks good and there is no apparent contamination, therefore we can speculate that the drop in viscosity comes from operating the fluid in a way that promotes thermal degradation. We suggest more frequent sampling on this system, next quarter and every 6 months after that.
02/29/16	Oil is in good condition. We are beginning to see some slight oxidation but it is not an issue at this time. Re-sample at next scheduled interval. (GCD) 90% Distillation Point is marginally high.

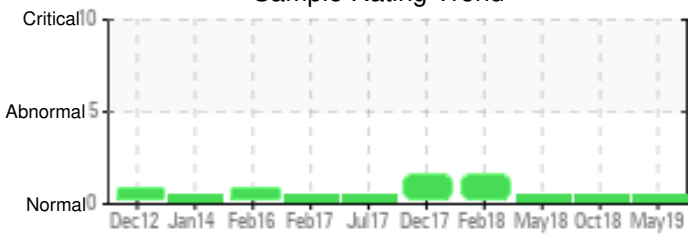
01/16/14

The fluid has not changed much since the last test in June 2013. It is still a mixture of Therminol 55 and Calflo AF. Everything looks normal. Re-sample as part of your PM in another 6 months or so.

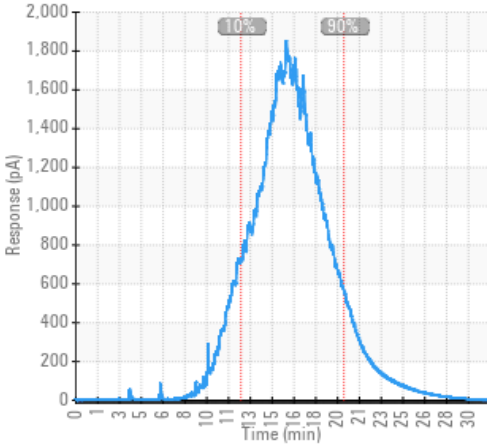
12/10/12	

01/15/11	The oil is in good condition as it appear to have received a little Calflo AF since marginally low.

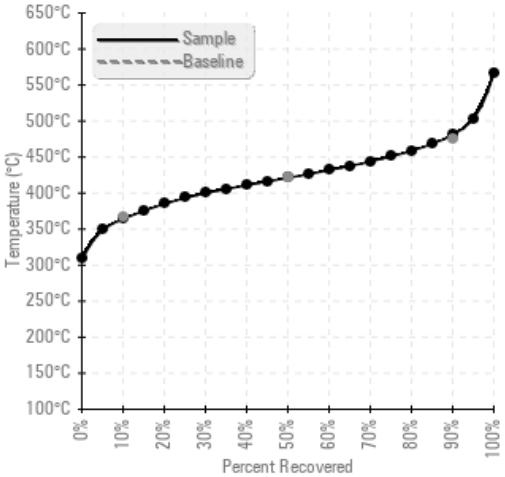
Sample Rating Trend



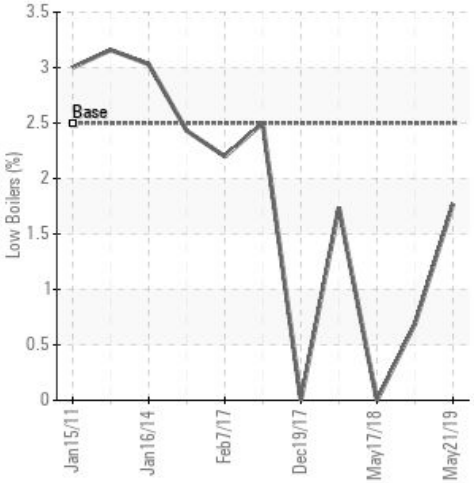
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



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This is the first sampls we receive under our program so we are building the database here so we can examine trends. The oil looks significantly different than Calflo AF values because there is very little Calflo AF in this fluid, we suspect is mainly what looks like Therminol 55. As the systems are topped-up the numbers will start looking more like Calfo AF. The oil condition is godo at this point, no action required. We suggest sampling twice per year, yearly minumum. Thank you for your business.