

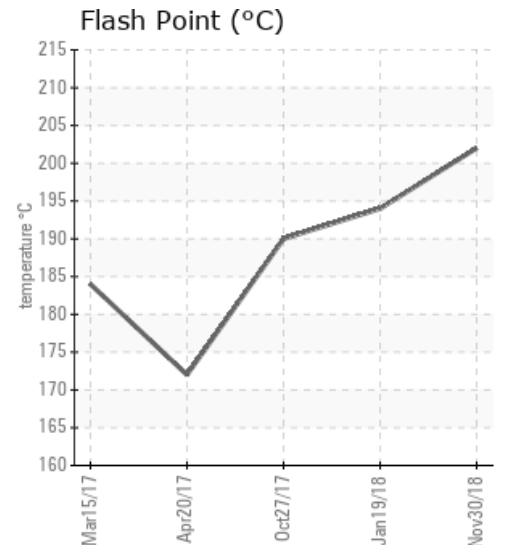
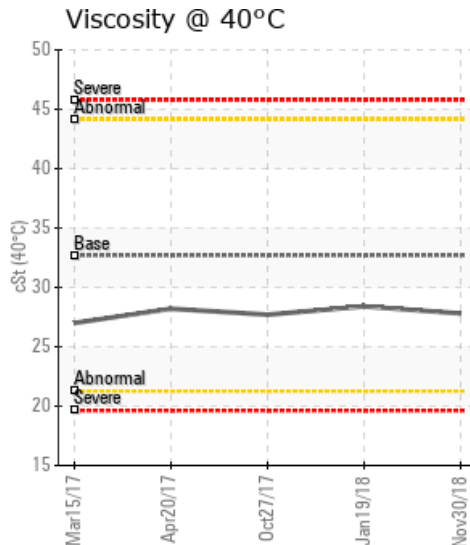
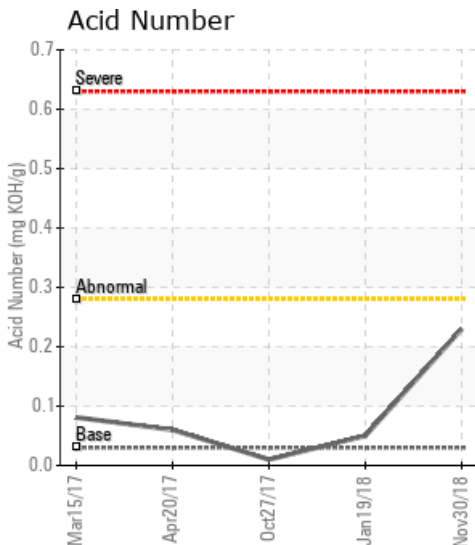
## TFS H/O SYSTEM #1

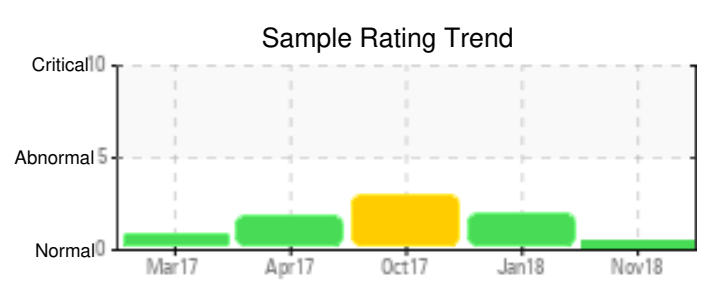
Customer: PTRHTF10176	System Information	Sample Information
CERTAINEED ROOFING 100 CERTAINEED DR JONESBURG, MO 63351 USA Attn: Jeff Montgomery Tel: (952)261-9532 E-Mail: jeffrey.d.montgomery@saint-gobain.com	System Volume: 4462 gal Bulk Operating Temp: 525F / 274C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: FSE	Lab No: 02258123 Analyst: Gaston Arseneault Sample Date: 11/30/18 Received Date: 12/18/18 Completed: 01/01/19

Recommendation: This system seems to create a bit more low boilers, so it's important to vent that system more frequently so that the viscosity and flash point remain closer to fresh oil. Otherwise the oil is in great condition. The oil is within acceptable parameters.

Comments:

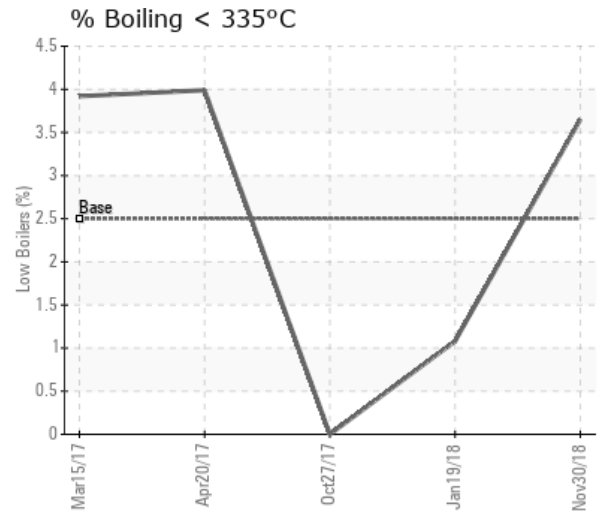
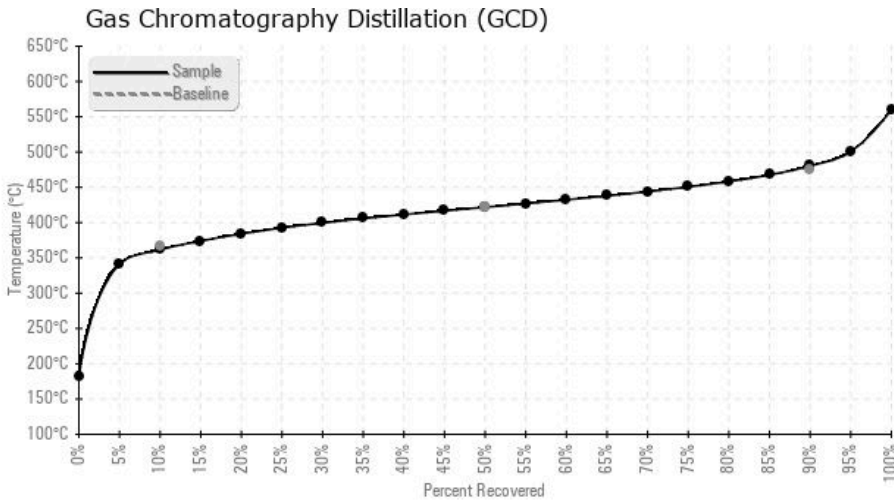
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/30/18	12/18/18	0y		396 / 202	13.8	27.8	0.23	0.054	683 / 362	791 / 422	897 / 480	3.65
01/19/18	01/26/18	2y		381 / 194	6.4	28.4	0.05	0.039	690 / 365	785 / 418	880 / 471	1.08
10/27/17	11/08/17	2y		374 / 190	18.1	27.7	0.01	0.034	696 / 369	786 / 419	889 / 476	0.00
04/20/17	05/01/17	2y	STRAINER MAIN PUMP	342 / 172	102.6	28.2	0.06	0.081	680 / 360	792 / 422	895 / 479	3.99
03/15/17	04/05/17	2y	STRAINER NR MAIN PMP	363 / 184	13.9	27.0	0.081	0.028	683 / 361	794 / 423	901 / 483	3.92
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	
11/30/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	0	
01/19/18	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	0	
10/27/17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	0	
04/20/17	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87	0	
03/15/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	0	
<b>Baseline Data</b>			0	0						0			0	0					0					270	

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



Historical Comments	
01/19/18	The fluid looks good based on the test results. Contamination by water is barely detectable. No signs of asphalt based on the viscosity and Vanadium. Flash point is strong and viscosity is normal. re-sample in 6 months per your normal procedure. COC Flash Point is marginally low.
10/27/17	While the flash point appears to have gone up a bit, the viscosity dropped slightly, showing the unpredictability of the flash point test. The oil condition shows We recommend to perform some venting of this fluid by sending the vapors to the expansion tank and replenish the losses with fresh oil. This should help restore both the viscosity and the flash point closer to fresh oil values. COC Flash Point is marginally low.
04/20/17	The sample has a bit more metals and solids but looks much darker, completely black, compared to the previous sample a month prior. maybe due to the sampling location. overall though the properties look identical to the previous sample, so the same comments apply. COC Flash Point is abnormally low.
03/15/17	The fluid viscosity is starting to drop although it's not bad enough to be flagged. This combined with the slightly reduced flash point indicate that there is a bit of thermal degradation going on. We suggest to vent the low boilers out of the expansion tank and replenish the lost volume with fresh oil until the expansion tank is 75% full when operating. COC Flash Point is marginally low.

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