

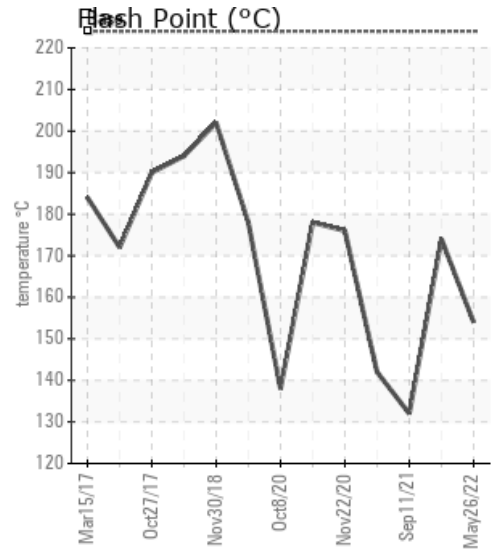
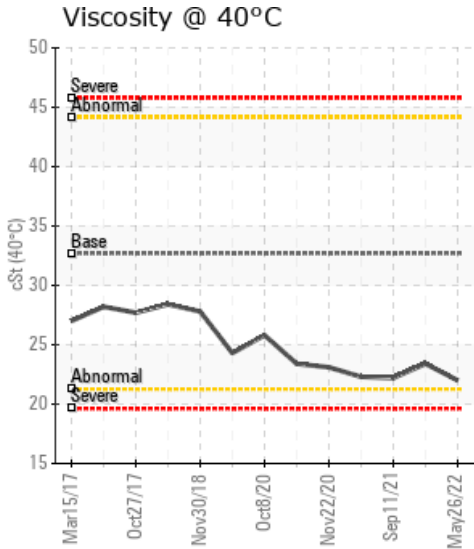
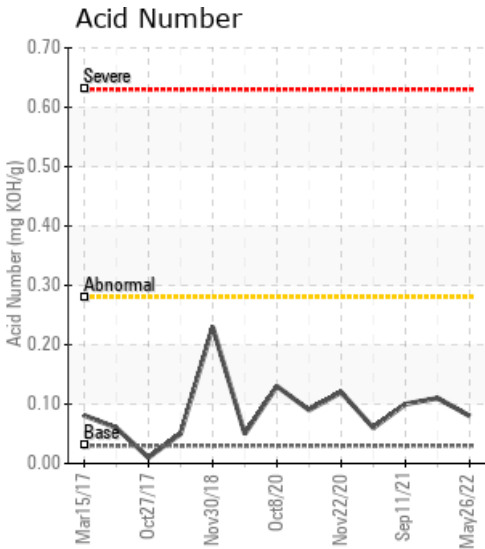
## TFS H/O SYSTEM #1

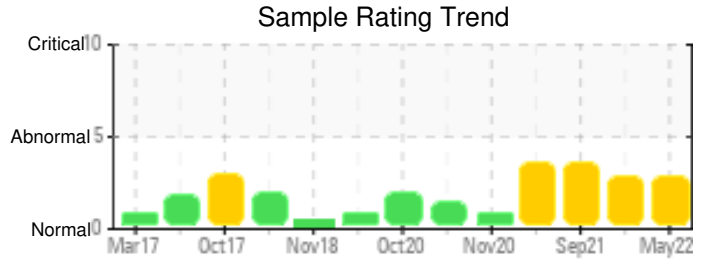
Customer: PTRHTF10176	System Information	Sample Information
CERTAINEED ROOFING 100 CERTAINEED DR JONESBURG, MO 63351 US Attn: Jeff Montgomery Tel: (952)261-9532 E-Mail: jeffrey.d.montgomery@saint-gobain.com	System Volume: 4462 gal Bulk Operating Temp: 553F / 289C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: FSE	Lab No: 02493691 Analyst: Neil Buchanan Sample Date: 05/26/22 Received Date: 06/09/22 Completed: 06/13/22 Neil Buchanan neil.buchanan@HFSinclair.com

Recommendation: Flash point is severely low and GCD shows the formation of low boilers. Other properties are acceptable.

Comments: COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.

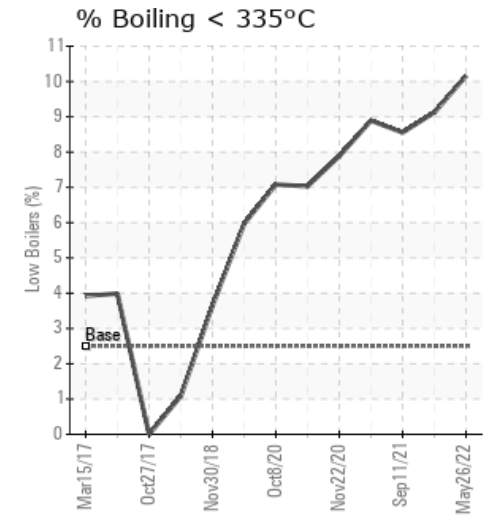
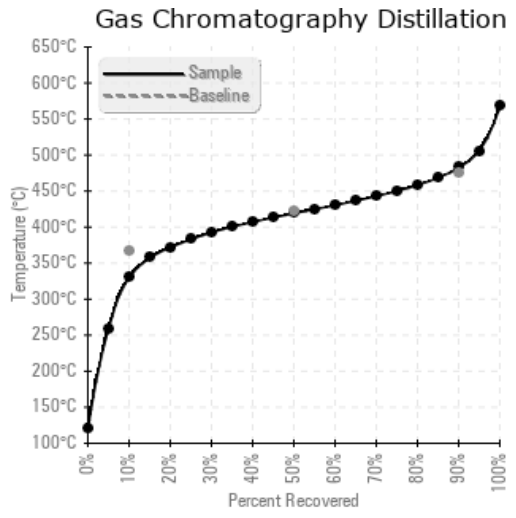
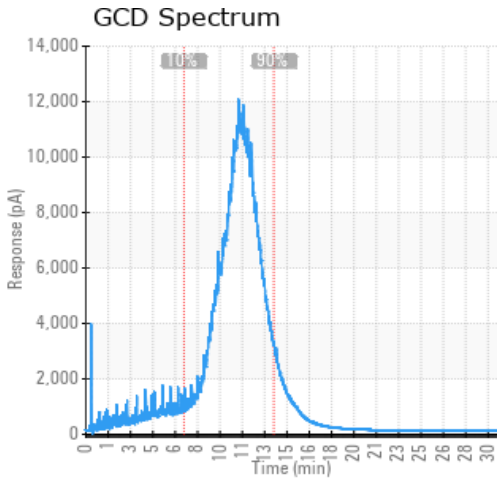
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/26/22	06/09/22	0.0y	sidestream filter	309 / 154	0.00	22.0	0.08	0.080	626 / 330	786 / 419	900 / 482	10.16
01/04/22	01/13/22	0.0y		345 / 174	14.9	23.4	0.11	0.145	641 / 338	787 / 420	901 / 483	9.12
09/11/21	11/22/21	5.0y	Side stream	270 / 132	36.9	22.2	0.10	0.033	647 / 342	788 / 420	899 / 482	8.55
08/30/21	09/07/21	4.0y	MAIN PUMP STRAINER	288 / 142	10.7	22.3	0.06	0.059	644 / 340	789 / 421	902 / 483	8.89
11/22/20	01/04/21	0.0y	Strainer	349 / 176	30.2	23.1	0.12	0.044	655 / 346	790 / 421	900 / 482	7.88
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
05/26/22	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	52	0
01/04/22	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0
09/11/21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	0
08/30/21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	0
11/22/20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	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	
01/04/22	Flash Point is marginally low and this is expected from the GCD results, GCD < 335C and graph, which shows the formation of some low boilers. COC Flash Point is abnormally low. (GCD) % < 335°C is marginally high.
09/11/21	Flash point is severely low. GCD confirms the presence of low boilers which will lower flash point. System should be safely vented. COC Flash Point is severely low. (GCD) % < 335°C is marginally high.
08/30/21	COC Flash Point is severely low. GCD indicates the formation of low boiling point hydrocarbons. System should be safely vented. COC Flash Point is severely low. (GCD) % < 335°C is marginally high.
11/22/20	Sample date needs to be corrected to 12/22/20 from 11/22/20. Sample shows no significant change from last sample. A very slight increase in light ends and minor changes in viscosity and flash point. Continue to operate as normal and look to plan a venting of light ends in next quarter. Resample as scheduled. COC Flash Point is abnormally low.

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