

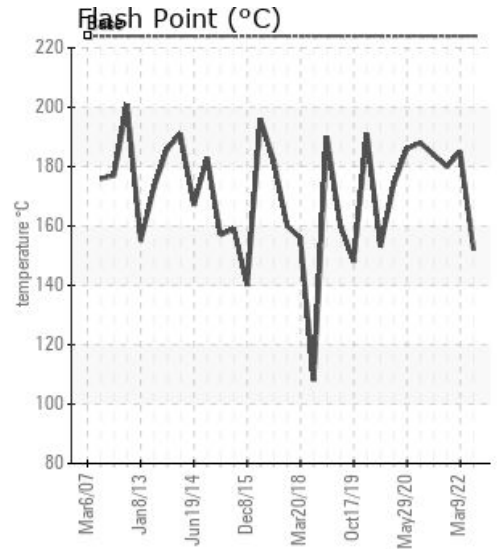
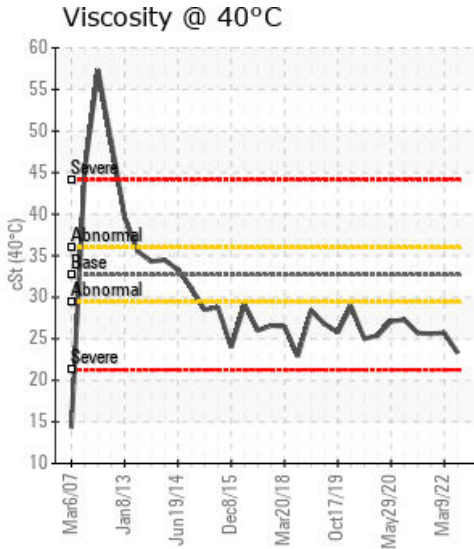
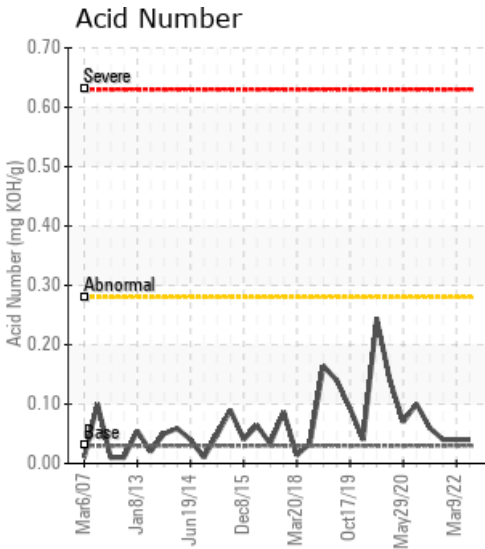
MAIN HOT OIL SYSTEM

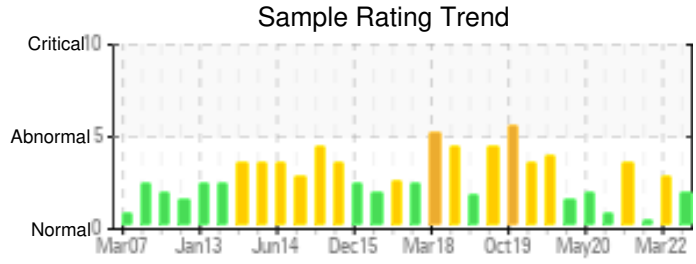
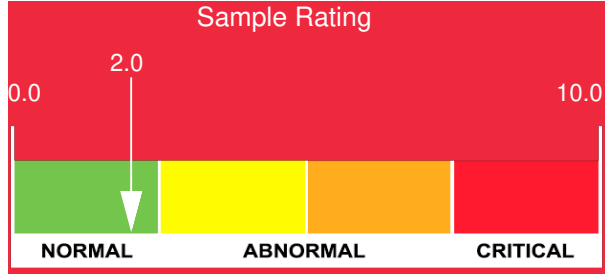
Customer: PTRHTF10068	System Information	Sample Information
Certainteed - Saint Gobain 1077 PLEASANT ST NORWOOD, MA 02062 USA Attn: David Fletcher Tel: (781)551-0656 E-Mail: david.r.fletcher@saint-gobain.com	System Volume: 5000 gal Bulk Operating Temp: 560F / 293C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: A.M.KINNEY	Lab No: 02503401 Analyst: Gregory Fernandez Sample Date: 07/28/22 Received Date: 08/04/22 Completed: 09/08/22 Gregory Fernandez gregory.fernandez@hfsinclair.com

Recommendation: The sample continues to exhibit indicators of thermal cracking and the development of low boilers. Typically these systems should be vented when the level approaches 9% of GCD <335C, and this sample now is below 9%. COC Flash Point also continues to fall and now reports at another low. Venting the system and topping off the fluid level with fresh fluid should be planned in the near future as corrective measures. The low Flash point is a potential concern, but plant personnel should determine at what level the Flash Point becomes a concern or alarm.

Comments:

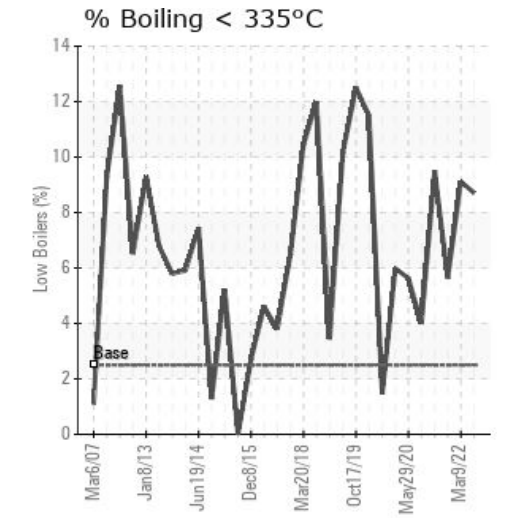
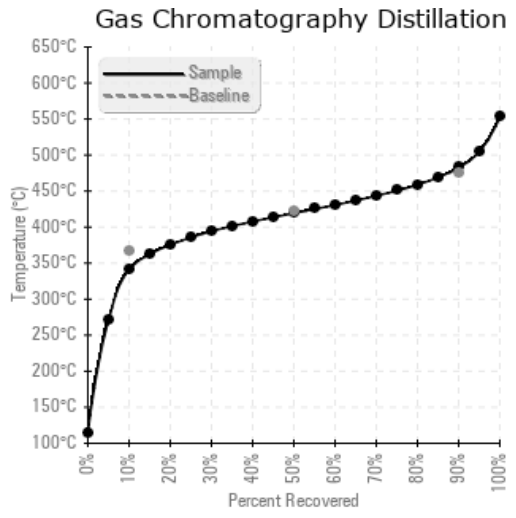
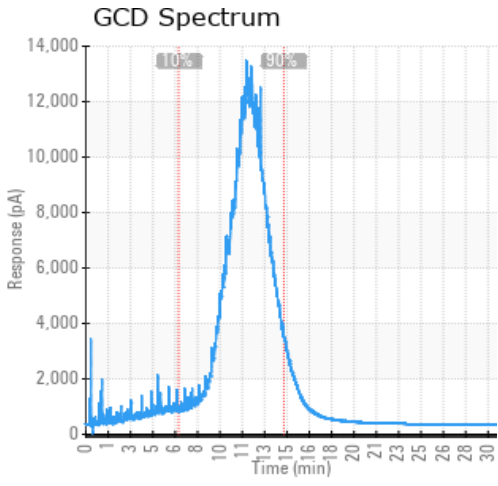
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/28/22	08/04/22	0.0y	heat exchanger	306 / 152	22.0	23.3	0.04	0.225	646 / 341	787 / 419	900 / 482	8.71
03/09/22	03/25/22	3.0y	heat exchanger	365 / 185	13.6	25.7	0.04	0.037	640 / 338	766 / 408	905 / 485	9.11
01/06/22	01/18/22	0.0y	heat exchange	356 / 180	29.5	25.6	0.04	0.047	673 / 356	792 / 422	897 / 481	5.64
08/31/21	09/10/21	0.0y		363 / 184	17.9	25.7	0.06	0.040	635 / 335	764 / 407	894 / 479	9.50
01/27/21	02/02/21	0.0y	Heat exchange	370 / 188	17.2	27.3	0.10	0.081	685 / 363	796 / 424	901 / 483	4.00
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
07/28/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0
03/09/22	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0
01/06/22	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	0
08/31/21	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
01/27/21	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	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	
03/09/22	This sample continues to show some signs of cracking oil and development of low boilers. Typically these systems should be vented when the level approached 9% as this has. The system can continue to be used but should plan for some maintenance in the near future. The flash point and viscosity are trending lower but steady. (GCD) % < 335°C is marginally high. COC Flash Point is marginally low.
01/06/22	Flash point and viscosity are both slightly lower than normal, and low boilers starting to creep higher. continue to use as normal and resample in 6-8 months. COC Flash Point is marginally low.
08/31/21	low boilers are approaching 10%. This is over double the last sample and starting to affect the viscosity. Consider venting the system if have not done and resample at next scheduled date. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low. COC Flash Point is marginally low.
01/27/21	The Main Hot Oil System sample results show a slight increase in Flash Point - 186 to 188, however, Acid number had a slight increase also from .07 to .10. GCD at 10% remains good at 363.0 as well the GCD 90% at 482.5. No Vanadium was detected. Continue to monitor by sampling at a routine basis. COC Flash Point is marginally low.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.