

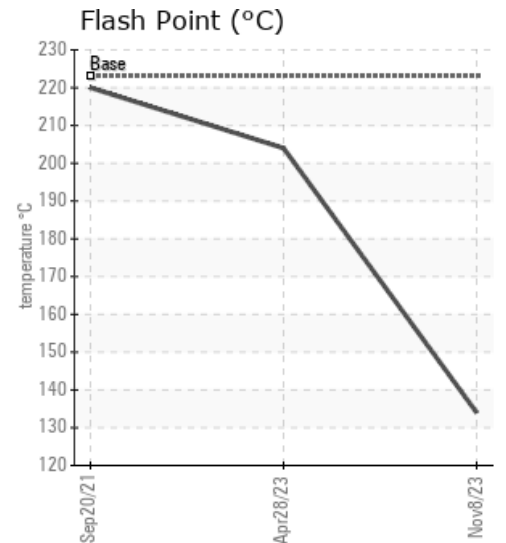
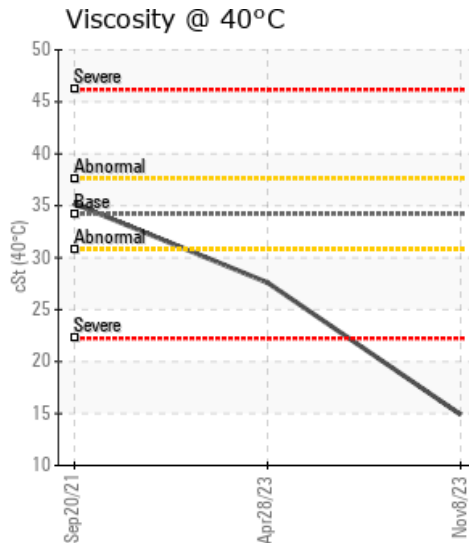
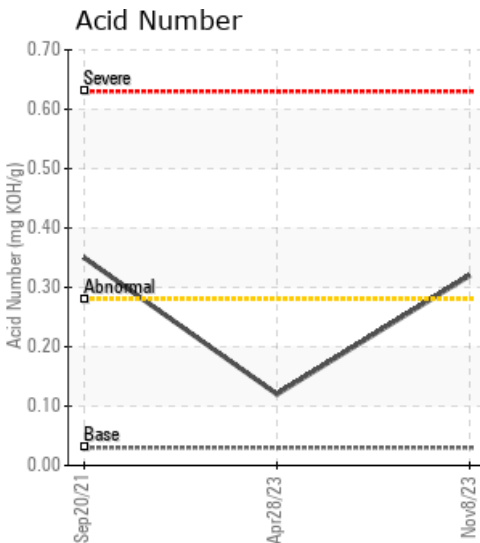
LINE 2

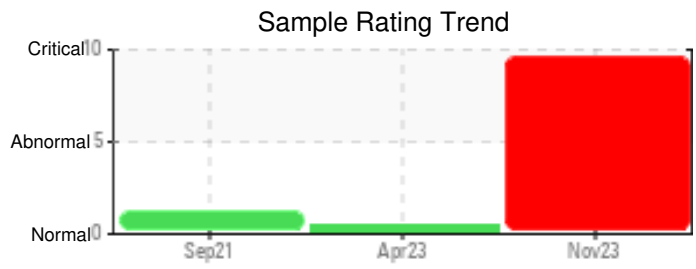
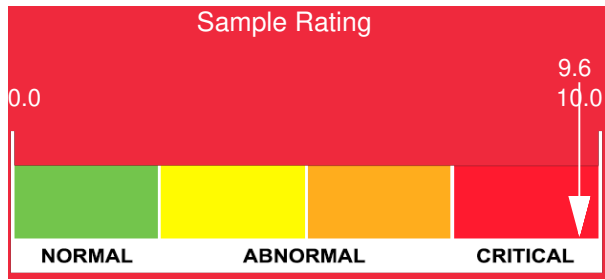
Customer: PTRHTF10249	System Information	Sample Information
BONDED LOGIC 1465 SHATTUCK INDUSTRIAL BLVD LAFAYETTE, GA 30728 US Attn: Donny Walls Tel: E-Mail: donnyw@bondedlogic.com	System Volume: 200 gal Bulk Operating Temp: 425F / 218C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02598058 Analyst: Jake Finn Sample Date: 11/08/23 Received Date: 11/21/23 Completed: 11/27/23 Jake Finn jake.finn@HFSinclair.com

Recommendation: Fluid is out of spec in several areas. Viscosity is less than half of what it should be, Flash point has dropped to 134°C, GCD <335°C is above 16%, and the 10% distillation point is 285.1°C. Acid number has also jumped from 0.12 to 0.32. Review of FTIR and other properties indicates there might be a foreign fluid present in the system, which would explain the significant drop in viscosity and distillation/flash point. Despite these numbers, there appears to be no indication of component wear at this time. However, to protect the heating elements and other components, and to maintain or restore higher efficiencies, I would recommend removing the current fluid, cleaning and/or flushing the system to remove any residuals, and refilling with new Petro-Therm.

Comments: (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low. Acid Number (AN) is abnormally high.

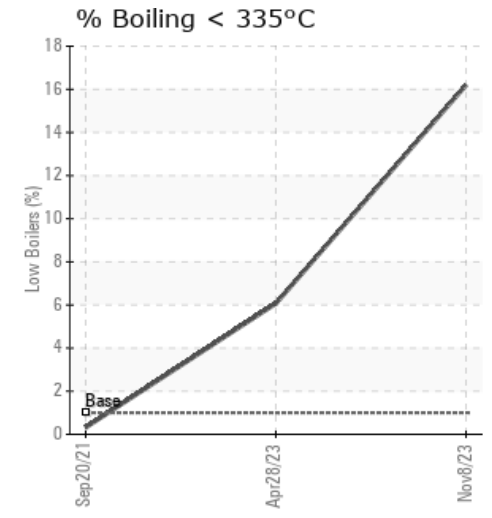
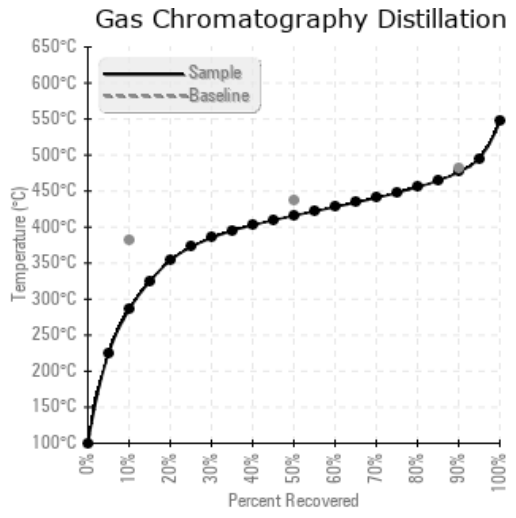
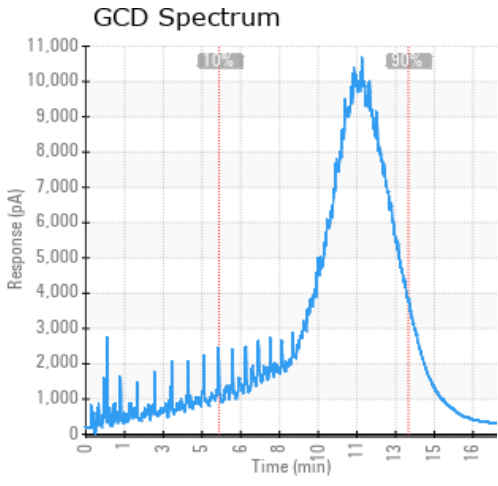
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/08/23	11/21/23	0.0y		273 / 134	0	14.9	0.32	0.132	545 / 285	781 / 416	889 / 476	16.20
04/28/23	05/10/23	0.0y		399 / 204	32.3	27.6	0.12	0.058	679 / 360	806 / 430	908 / 487	6.07
09/20/21	09/27/21	3.0y	DRAIN LINE	428 / 220	33.3	35.2	0.35	0.083	727 / 386	811 / 433	906 / 485	0.32
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





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
11/08/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/28/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/20/21	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				0	

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



Historical Comments

04/28/23	Overall test results are not bad, there is no sign of significant wear, contamination or fluid degradation. Note that the fluid viscosity is below the typical value, if a flushing or cleaning fluid was used, any residual fluid leftover could have caused sample viscosity to drop slightly. Aside from that, the sample indicates the system fluid is in great condition, feel free to reach out if you have additional questions or concerns. Otherwise, resample for testing in 12 months. Visc @ 40°C is abnormally low.
09/20/21	High acid number indicates the fluid in system has experienced some oxidation. There is no current indication of system component wear or contamination, but if system remains as is, it could result in corroded parts or component wear. Recommended to drain system and refill with fresh Petro-Therm, followed by regular oil analysis every 12 months. If possible, also perform visual inspection of system when fluid is replaced. Acid Number (AN) is abnormally high.

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