

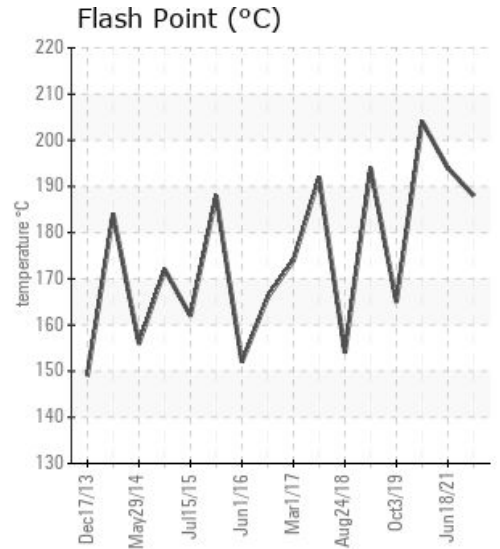
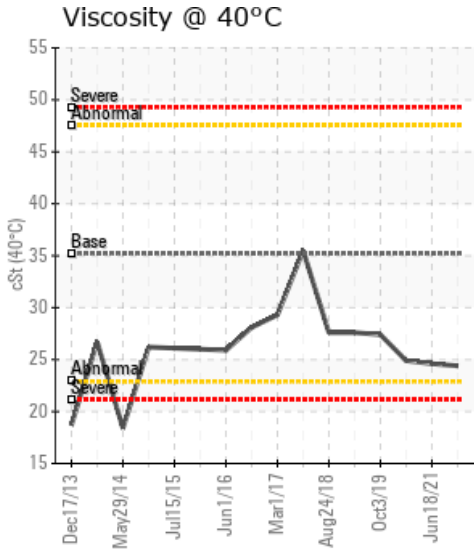
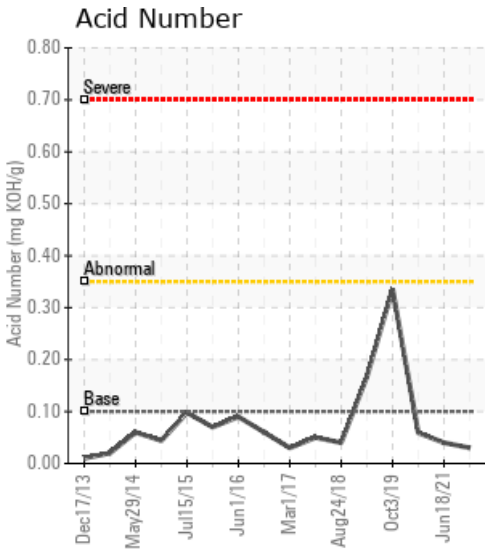
LN02 Filler Mixer Hot Oil System

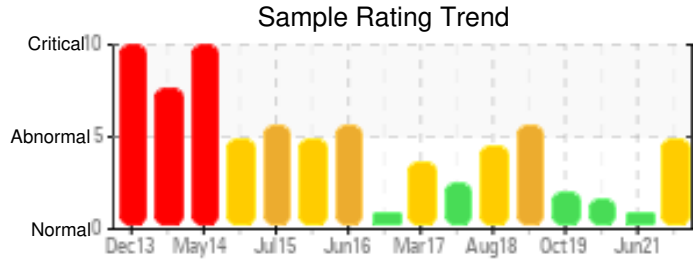
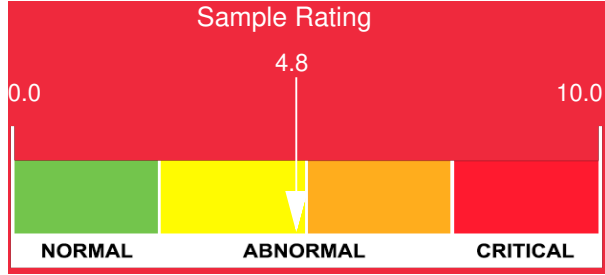
Customer: PTRHTF10141	System Information	Sample Information
TAMKO BUILDING PRODUCTS 2300 35TH ST TUSCALOOSA, AL 35401 USA Attn: Eric Foote Tel: x: E-Mail: eric_foote@tamko.com	System Volume: 650 gal Bulk Operating Temp: 530F / 277C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: HEATEC Inc.	Lab No: 02461603 Analyst: Jake Finn Sample Date: 12/03/21 Received Date: 12/13/21 Completed: 12/16/21 Jake Finn jake.finn@hollyfrontier.com

Recommendation: GCD 10% distillation point is severely low but has improved since last sample. GCD % <335°C is abnormally high but has also improved since last sample date. COC Flash point in marginally low and slightly lower than last sample date. Water content has also improved over the last several samples. If possible, consider venting the system to remove low boilers and improve GCD results. Despite the flagged results there is no current indication of acid generation or fluid breakdown that would cause concern. Fluid is therefore suitable for continued use and should be resampled for testing in one year.

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

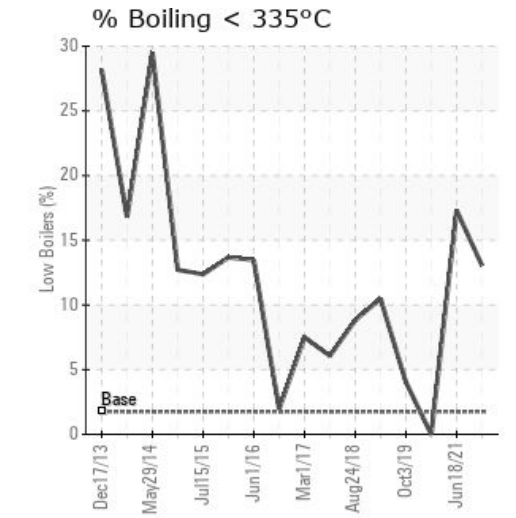
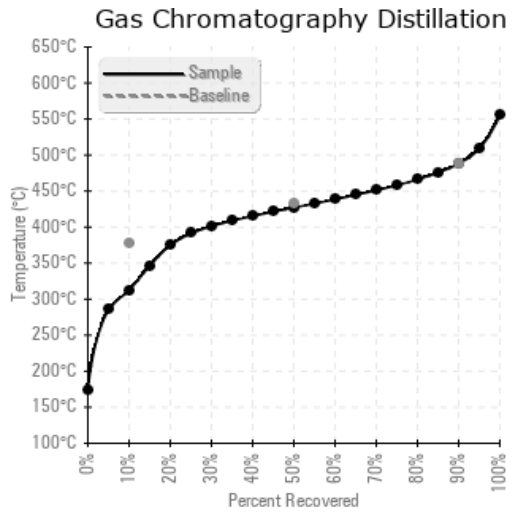
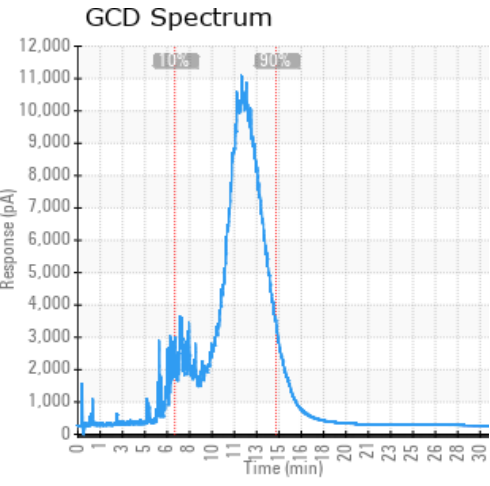
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/03/21	12/13/21	0.0m		370 / 188	7.7	24.4	0.03	0.042	594 / 312	801 / 427	910 / 488	13.05
06/18/21	06/24/21	0.0m		381 / 194	24.2	24.6	0.04	0.042	572 / 300	781 / 416	891 / 477	17.31
03/05/20	03/13/20	0.0m	PORT	399 / 204	26.6	24.9	0.059	0.081	749 / 398	825 / 441	935 / 502	0.00
10/03/19	10/15/19	0.0m		329 / 165	30.8	27.4	0.336	0.082	692 / 367	808 / 431	911 / 488	4.03
02/25/19	03/06/19	18.0m	PORT	381 / 194	595.6	27.6	0.167	0.096	625 / 330	780 / 416	894 / 479	10.49
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75





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
12/03/21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0
06/18/21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	20	0
03/05/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	24	0
10/03/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	1
02/25/19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	49	3	
Baseline Data			0	0						0			0	0				0	0				280	

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



Historical Comments	
06/18/21	GCD results indicate a higher formation of low-boilers as compared to previous samples. Venting the system may help in removing these low-boilers. Once system is vented and low ends are removed, I would recommend identifying the cause of low-end hydrocarbon formation and implementing measures to mitigate any potential risks. This will help to prolong the life of the fluid and system components. It could be as simple as changing system operating procedures to prevent prolonged heat sources applied to stagnant fluid pockets, i.e. continuing to circulate fluid during shutdown once heat source is turned off. Feel free to reach out for guidance if needed. Otherwise, the fluid is in good condition, shows no other signs of pump wear, water/dirt contamination or acid formation that could lead to sludge build-up. The fluid is currently suitable for continued use. Please resample and submit for testing in one year, or after changes have been made if desired. (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. (GCD) 90% Distillation Point is marginally low. COC Flash Point is marginally low.
03/05/20	Acid number and flash point have improved since last sample. Venting system may help improve GCD 10% distillation point and GCD 90% distillation point. Please remember to include time on oil and filter in future sample submissions. Fluid is otherwise suitable for continued use. Please resubmit for testing in one year. (GCD) 10% Distillation Point is marginally high. (GCD) 90% Distillation Point is marginally high. Very lite sand/dirt noted by lab.
10/03/19	Oil is suitable for continued use. Please resubmit sample in one year. Acid Number (AN) is abnormally high. COC Flash Point is abnormally low.
02/25/19	Venting the system will mitigate the 10% distillation curve values and may improve the Flash point. Please maintain bulk fluid temperature at the 530°F design parameters to flash off any moisture. Changing any system filters or kidney-loop filtering the fluid during any shutdown periods will remove any 'light debris' as seen by the lab. If any adjustments or modifications to the system are performed, please re-submit sample for verification. (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is marginally high. Water contamination levels are marginally high. ppm Water contamination levels are marginally high.

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