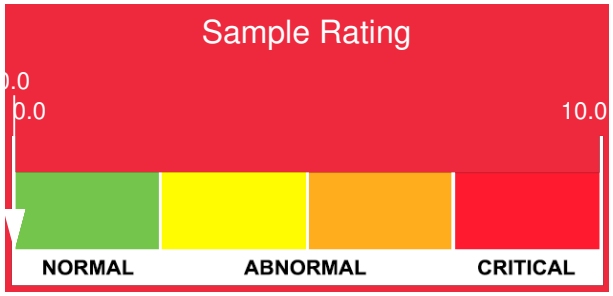
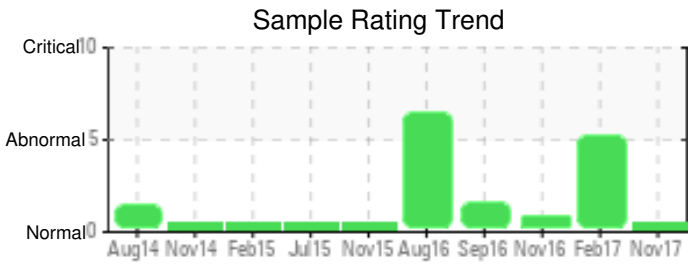




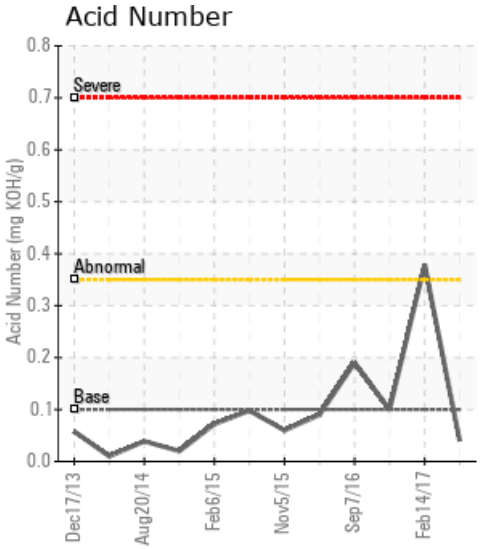
Laminate Storage/Delivery Hot Oil System

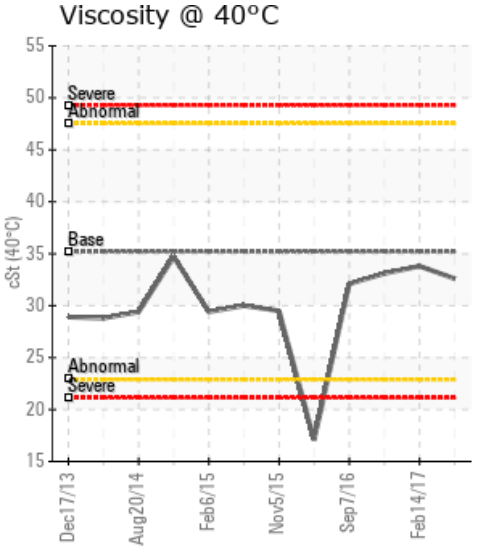
Customer: PTRHTF10141	System Information	Sample Information
TAMKO BUILDING PRODUCTS 2300 35TH ST TUSCALOOSA, AL 35401 USA Attn: Greg Colburn Tel: (205)752-3555 E-Mail: gregory_colburn@tamko.com	System Volume: 110 gal Bulk Operating Temp: 450F / 232C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: Hy-Way	Lab No: 02181731 Analyst: Manny Garcia Sample Date: 11/02/17 Received Date: 11/13/17 Completed: 11/20/17 To discuss this report contact Manny Garcia at 954-384-7259

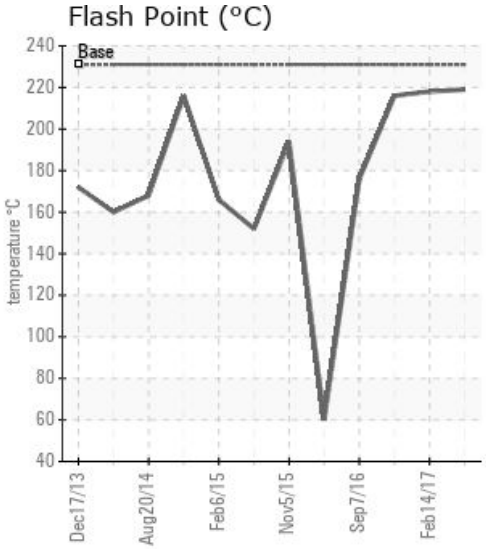
Recommendation: Oil is suitable for continued use; if appropriate, any system filters should be changed OR kidney loop filtration is recommended during the next shutdown to extend the life of the oil.

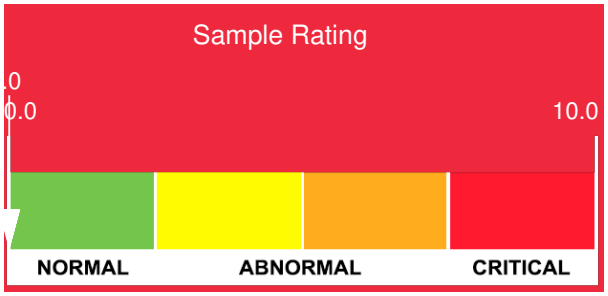
Comments: Wear Metals are Low; Contamination Levels are low; 2.3ppm water - low; Very Low Acid Numbers; 32.6 CsT @ 40oC Viscosity; 219 oC COC Flash Point; Pentane Insolubles are low; Very Light White Metal and debris visible

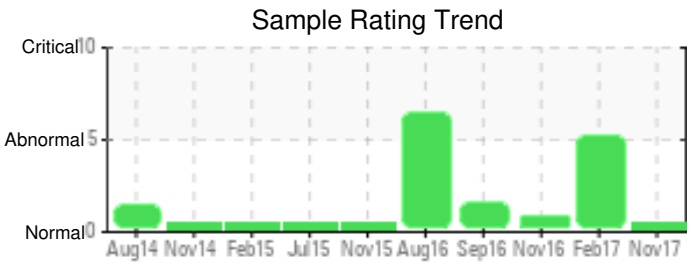
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/02/17	11/13/17	9m		426 / 219	2.3	32.6	0.04	0.024	695 / 368	806 / 430	903 / 484	4.08
02/14/17	02/21/17	3m	PORT	424 / 218	656.3	33.8	0.379	0.177	721 / 383	814 / 435	919 / 493	1.85
11/04/16	11/11/16	1m	PORT	421 / 216	74.5	33.1	0.10	0.036	715 / 380	813 / 434	918 / 492	2.43
09/07/16	09/16/16	1m	SAMPLE PORT	349 / 176	13.7	32.1	0.19	0.063	714 / 379	811 / 433	919 / 493	2.47
08/12/16	08/17/16	0m	SAMPLE PORT	140 / 60	12.9	17.1	0.09	0.141	582 / 305	783 / 417	895 / 480	12.55
11/05/15	11/18/15	0m		381 / 194	9.0	29.5	0.06	0.098	691 / 366	802 / 428	914 / 490	4.99
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75





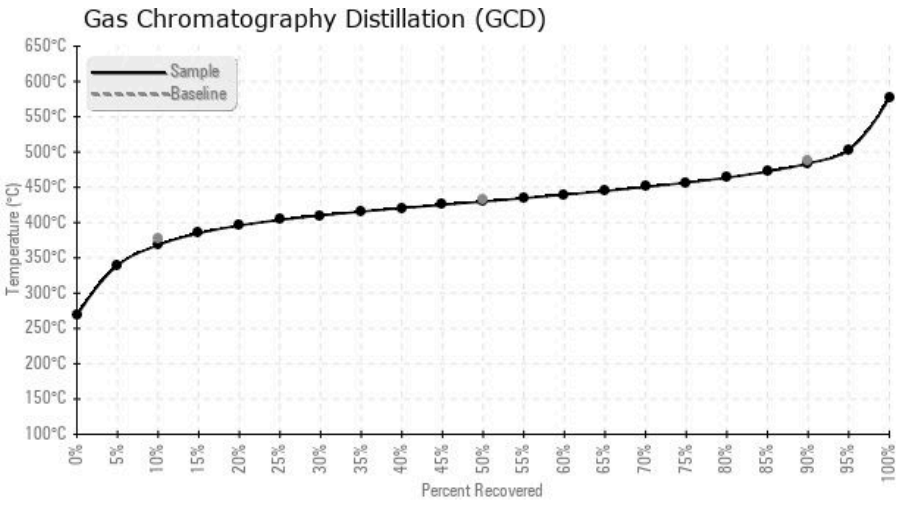


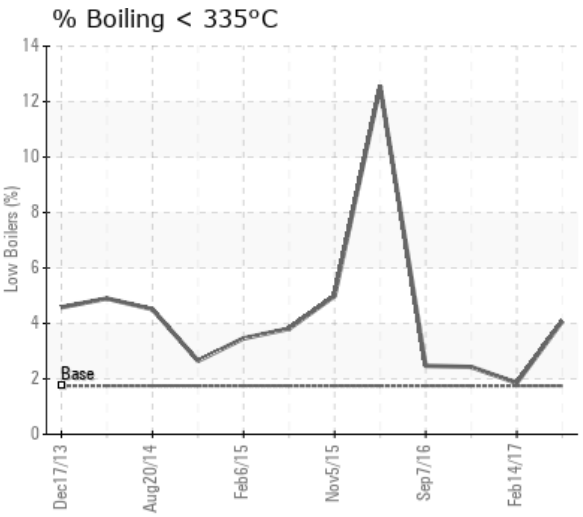




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/02/17	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	59	0
02/14/17	41	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	64	0
11/04/16	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0
09/07/16	3	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	61	0
08/12/16	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
11/05/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				280	

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





Historical Comments

02/14/17	This system had poor results in August of 2016 and since that time 2 samples were submitted that were very good. Unfortunately, this latest sample shows high metal content and debris that may be assisted by filtering the oil safely when appropriate to get these numbers back into check. Pulling off the water must be addressed and the acidity can only be assisted by 'sweetening' the existing charge. Please check the time on the 110 gallons in this system and it might be time for a complete drain, flush and re-charge with premium Petro Canada Calfo HTF as a last resort.Iron ppm levels are abnormal at 41ppm. Water contamination levels are abnormally high. 656.3ppm of Water. .2% of Free Water/.5% emulsified water. Acid Number (AN) is abnormally high. Viscosity is good at 33.8 CsT @40oC. COC Flash Point is satisfactory at 218oC. Distillation Curves are good in all cases. Pentane In-solubles are satisfactory. Very Light white metals/Very light debris.
11/04/16	Fluid distillation figures at 90% are high and 'venting' the system can bring these numbers back into check. Water in the oil can be boiled off or during operation/drained off during extended shutdown.Wear metals are acceptable/Contaminant is satisfactory/Water is high at 74.5ppm/Acid numbers are low/Viscosity is good at 33.1 CsT at 40oC/COC Flash point is good at 216oC and up from176oC at the last evaluation/(GCD) 90% Distillation Point is marginally high/pentane insoluble are low/very light debris visible in fluid. There was emulsified water seen by lab technician at sample receipt/crackle test performed, followed by Karl Fischer
09/07/16	This sample result is much better than the previous sample from 8/12 where it was recommended to vent the system to assist in increasing the flash point and the getting distillation figures back in check. Please vent the system again to mitigate any issues and send sample in to see if the 'venting' proved to work.Wear metals are low. Water is low. Acid number is satisfactory. Viscosity is good. COC Flash Point is abnormally low 176oC vs a recommended 223oC. (GCD) 90% Distillation Point is marginally high
08/12/16	The oil in this system is NOT suitable for continued use and the system should be stopped immediately, oil drained, system filters changed and system cleaned and re-filled with 220 gallons of Petro-Therm Heat Transfer Fluid.Wear metals are satisfactory/Water is satisfactory/Acid levels are satisfactory/Viscosity has been cut in half from ISO 32 to an ISO 15 grade - dangerous/Flash Point is dangerously low at 60oC - requirement is ~223oC/Distillation %@<335oC is HIGH/Distillation @10% is low/Very lite debris in oil sample. Oil is not suitable for continued use.
11/05/15	Please submit samples as scheduled and include Time on the Heat Transfer Unit, Time on the Oil and time on the filter during the next routine sample submission.Wear metals are satisfactory; Contaminant levels are low; Water is Negative; Acid Level is low; Flash Point is satisfactory and has increased by 43 degrees since the last sample from 4 months ago; Viscosity of the oil is satisfactory; Distillation curves are all satisfactory; Pentane salids are satisfactory; Very Light white metal visible by lab tech; Filter oil and continue use.