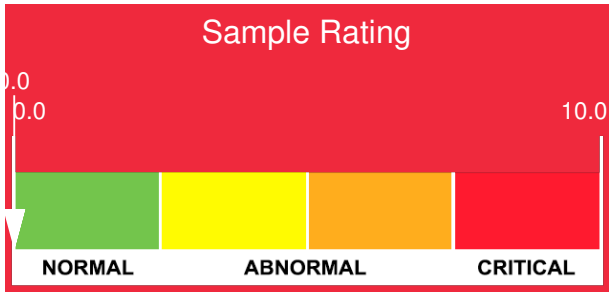
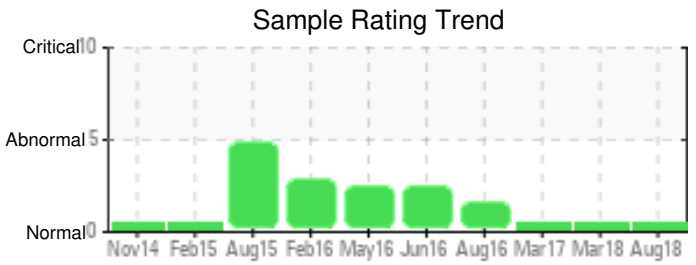




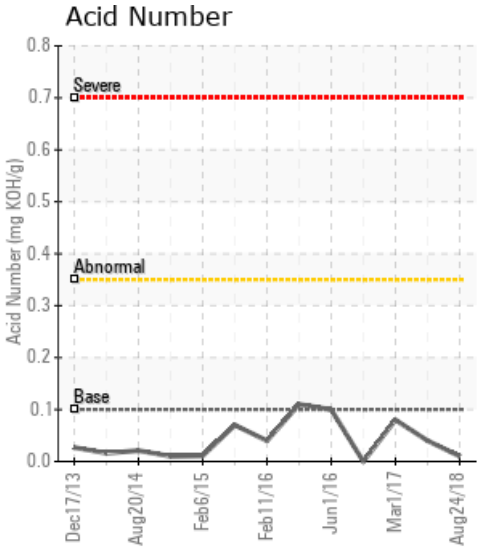
LN02 Laminator Hot Oil System

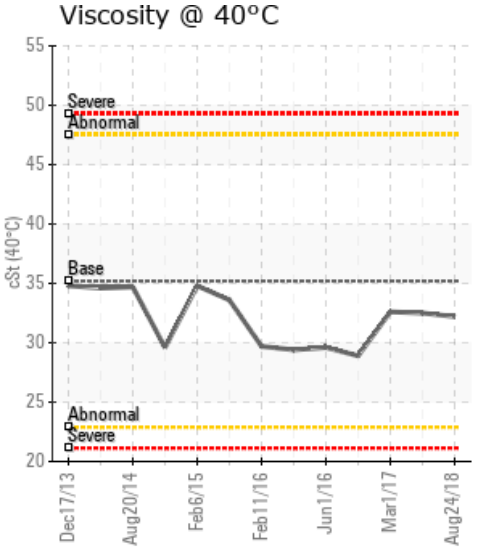
Customer: PTRHTF10141	System Information	Sample Information
TAMKO BUILDING PRODUCTS 2300 35TH ST TUSCALOOSA, AL 35401 USA Attn: Greg Colburn Tel: (205)752-3555 E-Mail: gregory_colburn@tamko.com	System Volume: 110 gal Bulk Operating Temp: 350F / 177C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: Heat Exchanger And T	Lab No: 02237307 Analyst: Manny Garcia Sample Date: 08/24/18 Received Date: 09/04/18 Completed: 09/06/18 To discuss this report contact Manny Garcia at 954-384-7259

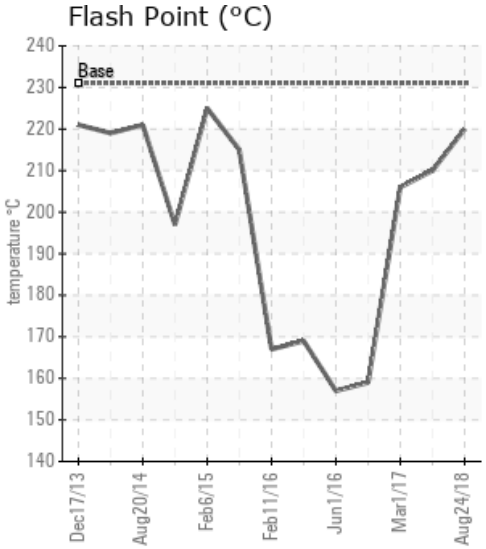
Recommendation: Fluid is suitable for continued use and sample from this 100-gal system should be re-submitted in August of 2019. All critical fluid parameters are in-line and free of contaminants.

Comments: Some very lite debris was noticed by the lab technician. If system has any filters please change them. Furthermore, the fluid could be filtered using a kidney loop system during a safe shutdown period to obtain optimum cleanliness levels.

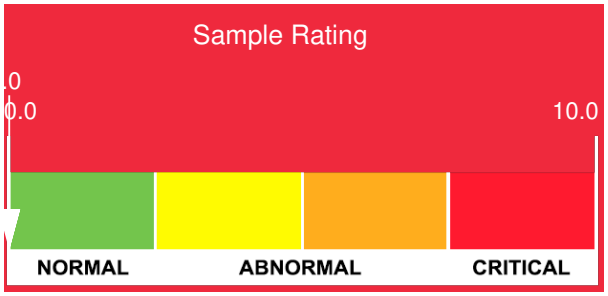
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/24/18	09/04/18	24m	PORT	428 / 220	17.1	32.2	0.01	0.052	710 / 377	808 / 431	903 / 484	1.78
03/02/18	03/13/18	12m		410 / 210	15.9	32.5	0.04	0.184	717 / 381	792 / 422	902 / 483	0.00
03/01/17	03/07/17	13m	PORT	403 / 206	0.00	32.6	0.08	0.057	710 / 377	810 / 432	909 / 487	1.90
08/05/16	08/11/16	0m	SAMPLE PORT	318 / 159	9.2	28.9	0.000	0.034	703 / 373	810 / 432	902 / 483	3.65
06/01/16	06/09/16	0m	SAMPLE PORT	315 / 157	11.9	29.6	0.10	0.032	692 / 367	786 / 419	876 / 469	2.46
05/04/16	05/13/16	0m	SAMPLE PORT	336 / 169	9.2	29.4	0.11	0.011	752 / 400	824 / 440	934 / 501	1.11
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75

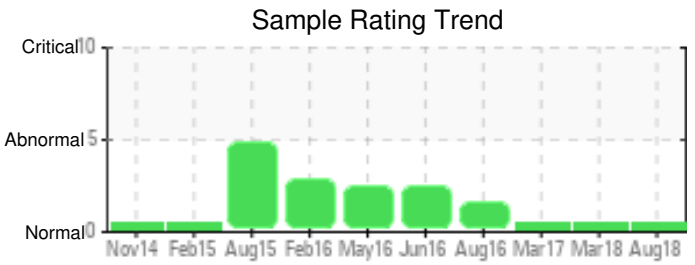






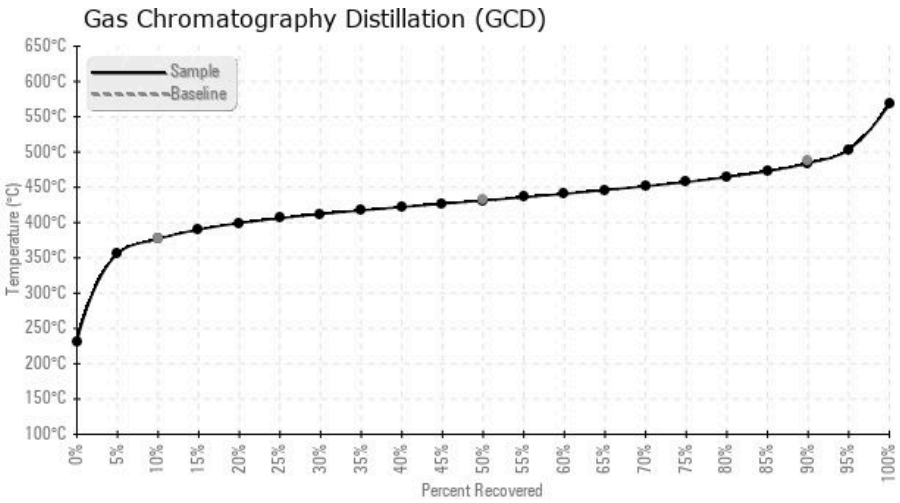
PETRO-CANADA LUBRICANTS

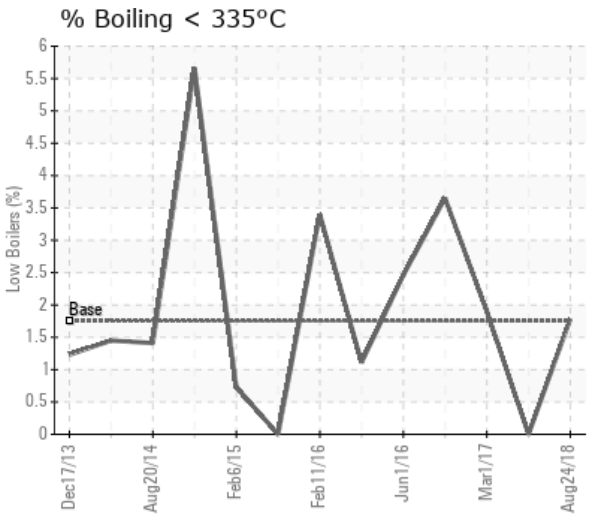




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
08/24/18	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	44	1
03/02/18	71	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	60	1
03/01/17	2	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	106	0
08/05/16	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
06/01/16	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
05/04/16	0	0	0	0	0	0	0	0	0	0	2	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

03/02/18	Fluid is suitable for continued use. Please re-sample and submit to the lab in 1-year.An increase in the iron level is noted. All other component wear rates are normal. Very light debris has been noticed visually. Changing system filters, if any, is recommended and/or using a portable filter cart during the next scheduled maintenance will clean the fluid.
03/01/17	Please re-sample at normal intervalWear metals are low/Contaminant levels are low/Additive pack appears to be satisfactory/Viscosity is satisfactory/COC Flash Point is good/Pentane insoluble are good/Very light debris seen in sample/no water
08/05/16	Samples have been received in increments of 2 months, 1 month, 3 months and 6 months historically for the last 5 samples. 4 samples received in 2016. Most heat transfer fluid (HTF) systems are annual sample recommendations, unless there is some sort of mitigation performed to improve on certain fault areas. Venting the system may help improve the low flash point. This system appears to be 110 gallon, hence taking out 10% of the used oil & replacing with virgin Petro-Therm will improve the oil condition. Please include the HTF System Unit Age and the time on the 110 gallon oil charge during the next routine oil samples.Wear metals are low; good/Contaminant is low/Water is low/Viscosity of the oil is in range/Flash Point is low at 159oC, but only 2oC improvement from last sample/Distillation curves are very good and improved from last 2 samples for the 90% distillation range. All distillation curves in check now.
06/01/16	'Vent' the system to mitigate the low 90% distillation value. Consider taking out 10% of the system volume and replace with virgin Petro-Therm to increase the Flash Point and this could assist in bringing up low distillation values at 90%. Please include the age of the oil and the system during the next scheduled oil sample submission.Wear metals are satisfactory; Contaminant levels are very low; Water is in an acceptable/low range; ISO Viscosity grade is good; COC Flash Point is severely low and has been trending this direction since February of 2016. All distillation points are acceptable except (GCD) 90% Distillation Point is marginally low. Very light debris visible.
05/04/16	Replacing no more than 10% of the oil in the system with virgin Petro-Therm may assist in increasing the low Flash Point figures. 'Venting' the system may assist in reducing the distillation curve numbers.Include the age of the oil and the age of the unit when the next annual sample is submitted, please.Wear metals are satisfactory; Contaminant levels are low; Water is nil; Acid levels are low; Viscosity of oil is good; Flash Point of the oil is low. 10% distillation curve is slightly high; 90% distillation curve is slightly high. Pentane solids are satisfactory; Very light debris found in oil sample;