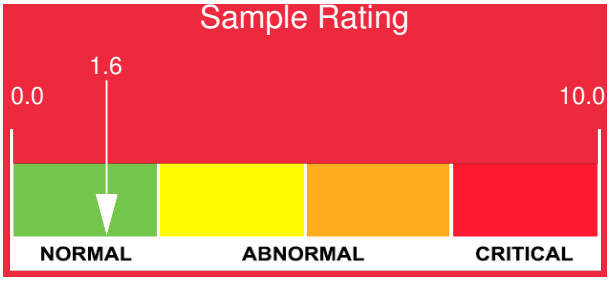
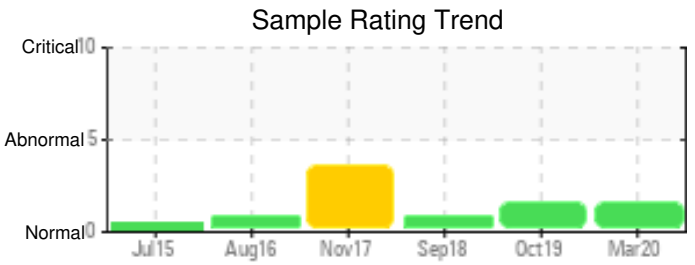




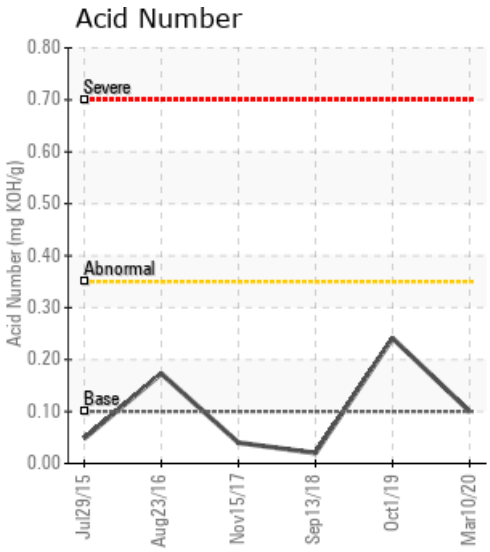
LINE 1

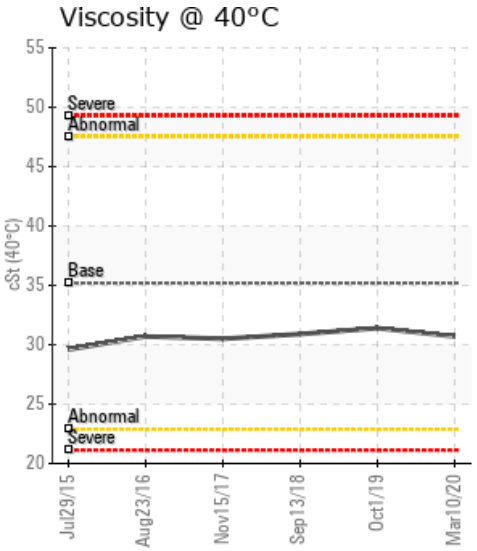
Customer: PTRHTF10164	System Information	Sample Information
Malarkey Roofing 3400 S. Council Rd OKLAHOMA CITY, OK 73179 USA Attn: Dillard Mathews Tel: (405)261-6900 E-Mail: dmathews@malarkeyroofing.com	System Volume: 600 gal Bulk Operating Temp: 565F / 296C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: AMERICAN HEATING	Lab No: 02347521 Analyst: Garrett Bapp Sample Date: 03/10/20 Received Date: 04/06/20 Completed: 04/27/20 Garrett Bapp Garrett.Bapp@HFSinclair.com

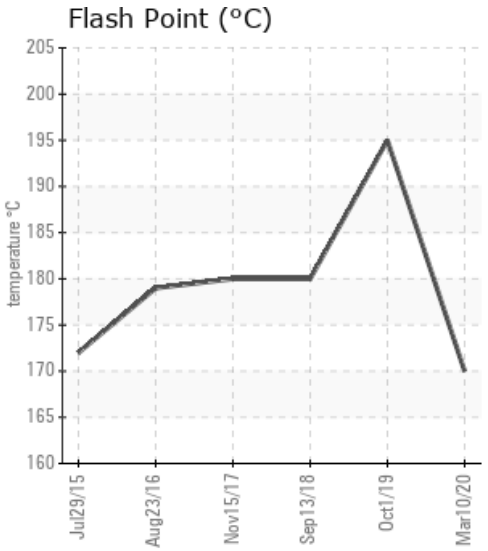
Recommendation: System is in good health. Fluid continues to show signs of thermal degradation. COC Flash Point of 170°C is 61°C below new. All other parameters are within targets. Recommend venting of low boilers from the expansion tank.

Comments: COC Flash Point is severely low.

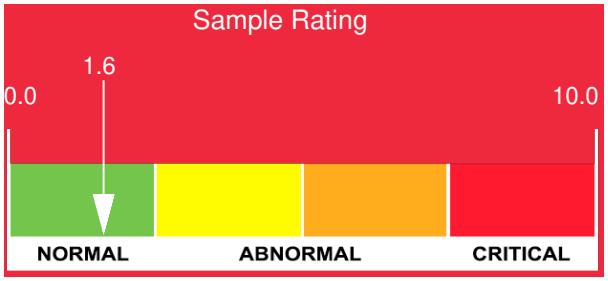
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/10/20	04/06/20	8.0y	SAMPLE PORT	338 / 170	6.5	30.7	0.10	0.154	697 / 370	805 / 430	919 / 493	3.72
10/01/19	10/15/19	5.0y		383 / 195	12.8	31.4	0.241	0.210	726 / 386	821 / 438	936 / 502	0.00
09/13/18	10/18/18	6.5y		356 / 180	16.5	30.9	0.02	0.054	705 / 374	791 / 422	895 / 480	0.36
11/15/17	11/16/17	5.5y		356 / 180	142.9	30.5	0.04	0.045	643 / 339	789 / 420	905 / 485	8.85
08/23/16	10/27/16	1.0y		354 / 179	6.2	30.7	0.173	0.003	682 / 361	800 / 427	928 / 498	5.08
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75

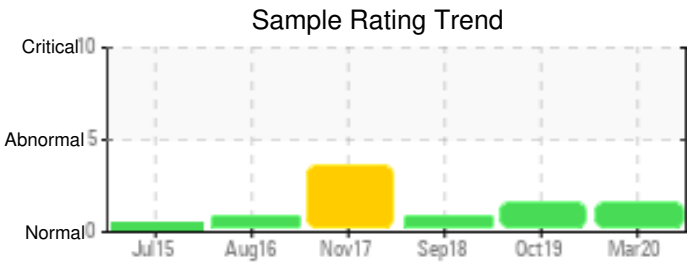






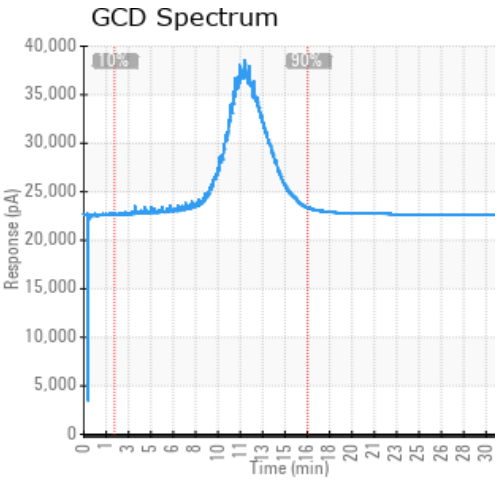
PETRO-CANADA LUBRICANTS

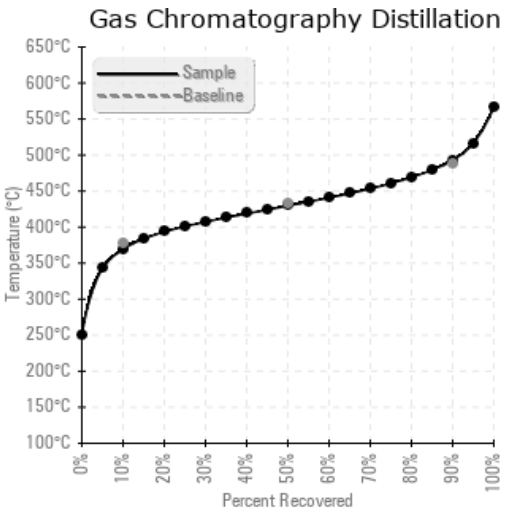


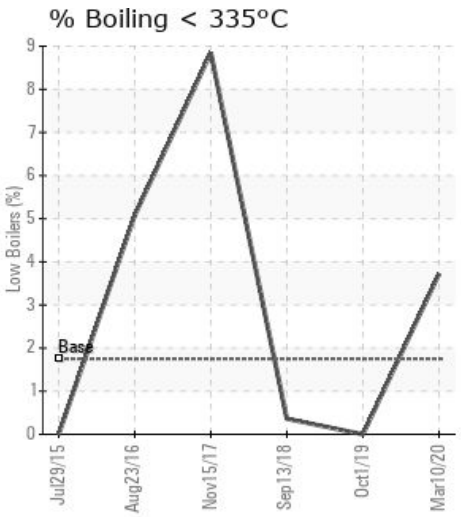


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/10/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0
10/01/19	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0
09/13/18	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	30	0
11/15/17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	0
08/23/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	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

10/01/19	Fluid is suitable for continued use. There is evidence of oxidation and thermal cracking. Acid number is rising. Viscosity is slightly reduced but still within viscosity grade. Flash point is 36°C lower than specified for new fluid. (GCD) 90% Distillation Point is slightly elevated. Pentane Insolubles has increased from previous sample. To increase the longevity of fluid, vent low boilers and a 20% drain and refill during the next system shutdown should help. Continue monitoring and yearly sampling.System wear in good health. System contaminants in good health. (GCD) 90% Distillation Point is marginally high. COC Flash Point is marginally low.
09/13/18	Fluid is suitable for continued use. There is evidence of thermal degradation. Viscosity is slightly reduced from original viscosity, yet remains an ISO 32 fluid. Flash Point has decreased. Pentane insolubles and debris have increase. Recommend venting of low boilers, as a minimum action. To increase the longevity of the bulk fluid, a 20% drain and refill during the next system shutdown should help. Continue to submit annual heat transfer fluid samples. COC Flash Point is abnormally low.
11/15/17	Fluid is suitable for continued use. There is evidence of thermal degradation and additive depletion. Viscosity is slightly reduced from ISO 32, yet remains an ISO 32 fluid. Low Boilers have increased. Flash Point has decreased. Pentane insoluble have increase. Phosphorus has decreased. Fluid is more than halfway to condemning. Recommend venting of low boilers, as a minimum action. Only to increase the longevity of the bulk fluid, a 20% drain and refill during the next system shutdown should help. Continue to submit annual heat transfer fluid samples. COC Flash Point is abnormally low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.
08/23/16	Phosphorus, Viscosity, and Flash Point are all low. This data, plus a left peak on the GCD profile, indicates there may be a residual of the flushing fluid in the system. Fluid is suitable for continued use. COC Flash Point is abnormally low.