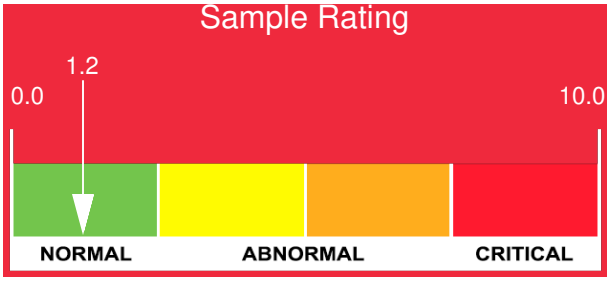
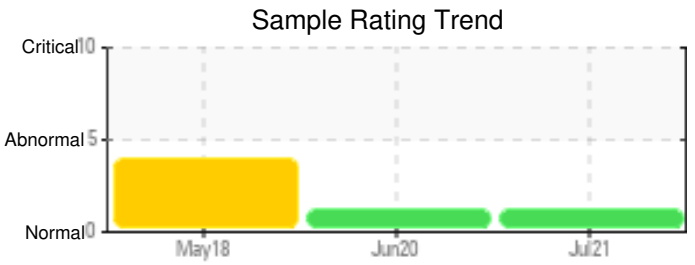




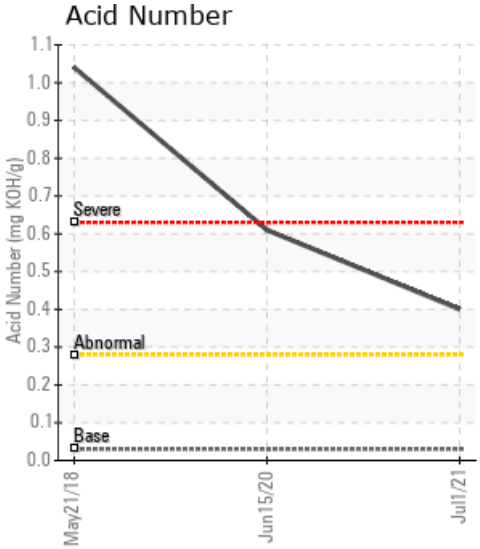
[7K AREA] 009-HE-101

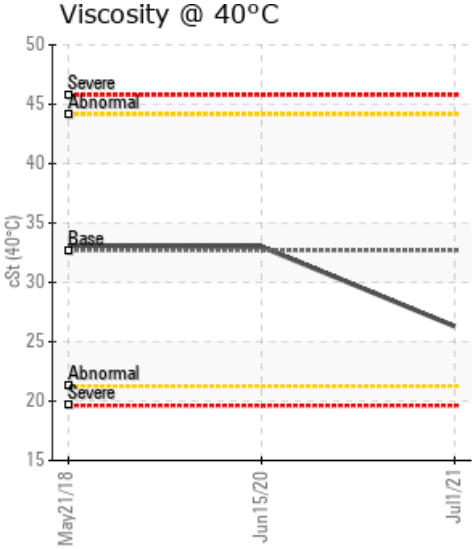
Customer: PTRHTF10177	System Information	Sample Information
Materia Inc 7629 State Hwy 75 South Huntsville, TX 77340 USA Attn: Robert Durr Tel: (713)447-9561 E-Mail: rdurr@materia-inc.com	System Volume: 300 gal Bulk Operating Temp: 320F / 160C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: ADVANTAGE	Lab No: 02434454 Analyst: Garrett Bapp Sample Date: 07/01/21 Received Date: 07/22/21 Completed: 08/12/21 Garrett Bapp Garrett.Bapp@hollyfrontier.com

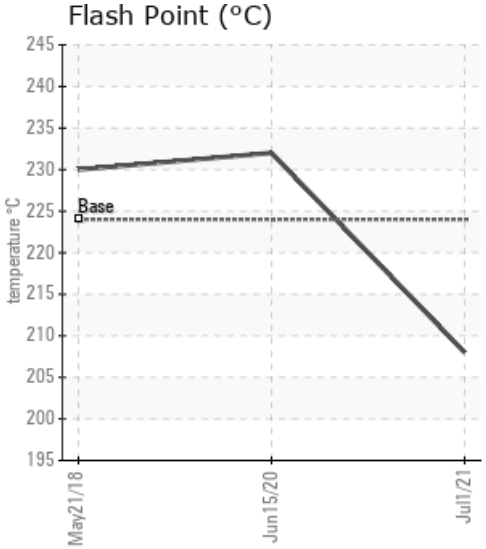
Recommendation: Acid number remains elevated while viscosity has dropped from previous sample. Could be due to addition of a lower viscosity product or indication of thermal degradation. Lower than normal COC flash point indicates that thermal degradation is occurring. Recommend to replace at least 50% of system volume at minimum.

Comments: Acid Number (AN) is abnormally high.

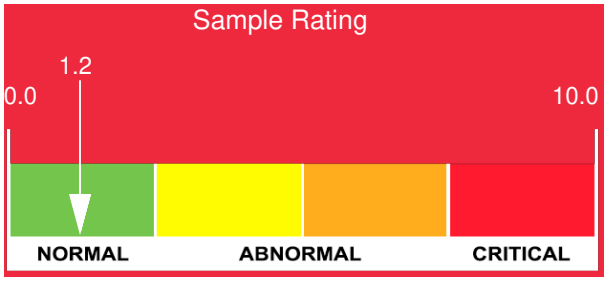
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/01/21	07/22/21	2.0y	TANK	406 / 208	16.7	26.3	0.40	0.138	685 / 363	791 / 422	889 / 476	3.94
06/15/20	06/25/20	4.0y	TANK	450 / 232	5.8	33.0	0.61	0.100	706 / 375	802 / 428	901 / 483	0.70
05/21/18	06/06/18	0.0y		446 / 230	7.6	33.1	1.04	0.074	727 / 386	794 / 423	892 / 478	0.00
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

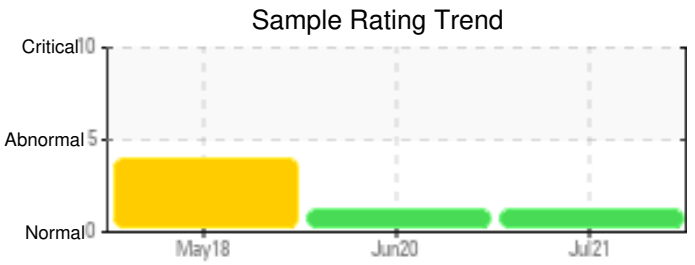






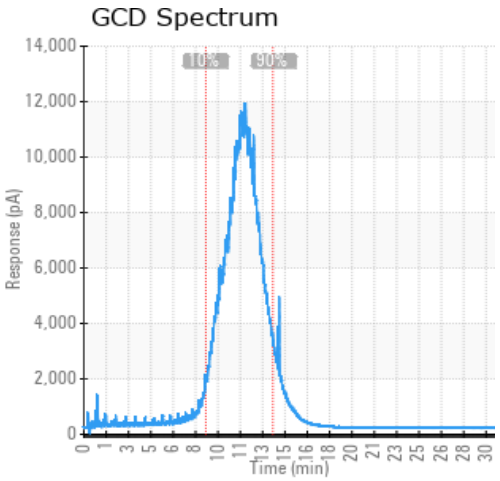
PETRO-CANADA LUBRICANTS

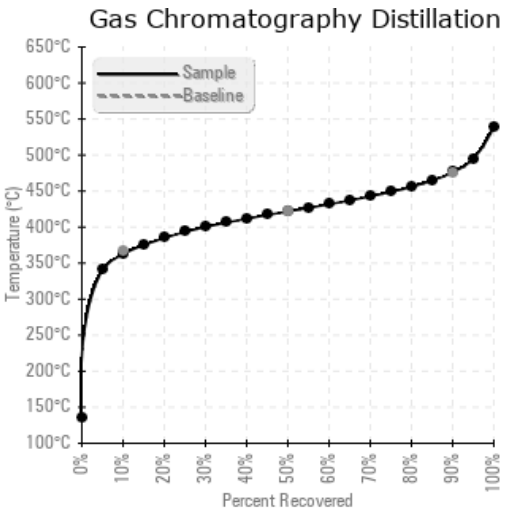


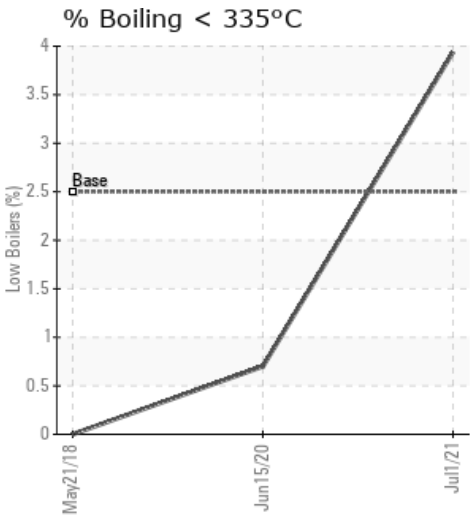


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
07/01/21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	262	0
06/15/20	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	260	0
05/21/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0
Baseline Data			0	0						0			0	0					0				270	

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







Historical Comments

06/15/20	Acid Number (AN) is abnormally high. Fluid appears to be dehydrated, changed or sweetened over the last two years. There is evidence of mild thermal degradation. Because of the acid number, stay cognizant of possible system erosion. To address the high AN, a system fluid change is warranted. Otherwise, thermal transfer rates should not have changed much over the last two years. If it has, then inspect the immersion heater, and look for carbon deposits.
05/21/18	Total Acid Number is high without any other properties supporting a symptom with the fluid. Look for possible system contamination, change fluid, and resample in 6 months. Acid Number (AN) is severely high. (GCD) 10% Distillation Point is marginally high.