

**[TOURMALINE / 01-35-060-5W6] H-730**

**Customer: PTRHTF20175**  
 QUADRA CHEMICALS  
 7802 98 STREET  
 CLAIRMONT, AB T0H 0W0 Canada  
 Attn: Quadra Samples  
 Tel:  
 E-Mail: quadra\_samples@quadra.ca

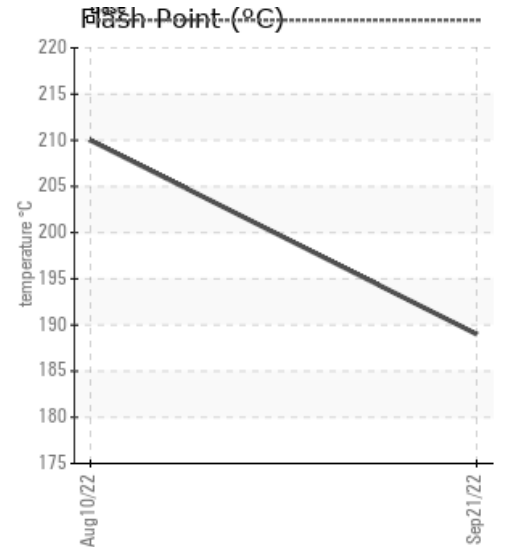
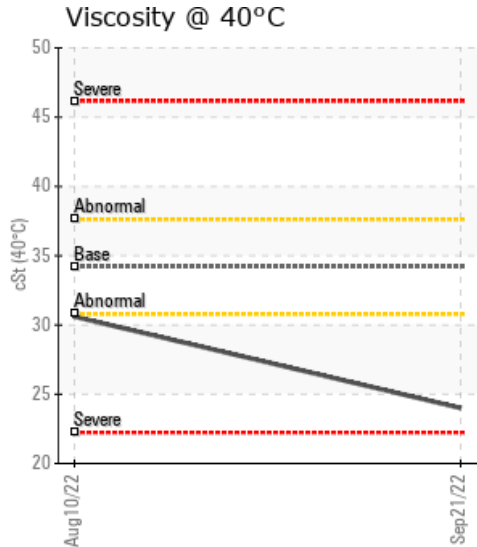
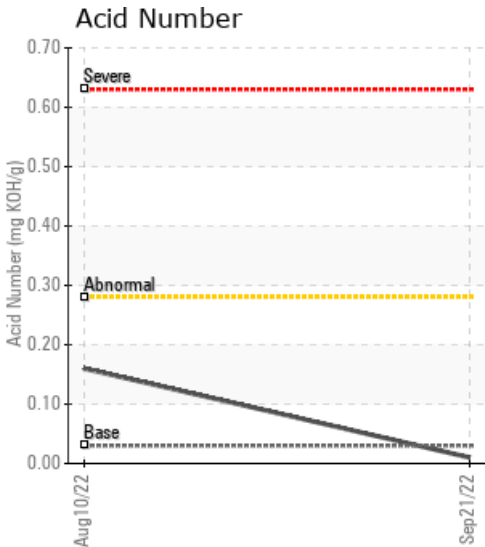
**System Information**  
 System Volume: 0 gal  
 Bulk Operating Temp: Not Specified  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA PETRO-THERM  
 Make:

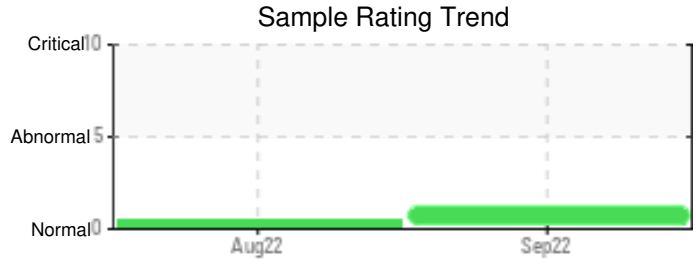
**Sample Information**  
 Lab No: 02513072  
 Analyst: Clinton Buhler  
 Sample Date: 09/21/22  
 Received Date: 09/26/22  
 Completed: 09/29/22  
 Clinton Buhler  
 Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate symptoms related to either thermal degradation, mixing with process fluids and/or high blanket gas pressure: see reduced fluid viscosity and flash point and increased low boiler vapor content (4.45%). It is advised to perform regular venting of the expansion tank to remove the low boiler vapors which will help improve these parameters. Please contact Petro-Canada Technical Services to discuss further

Comments:

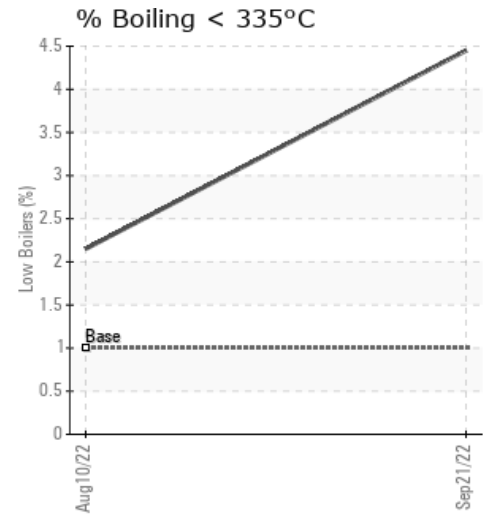
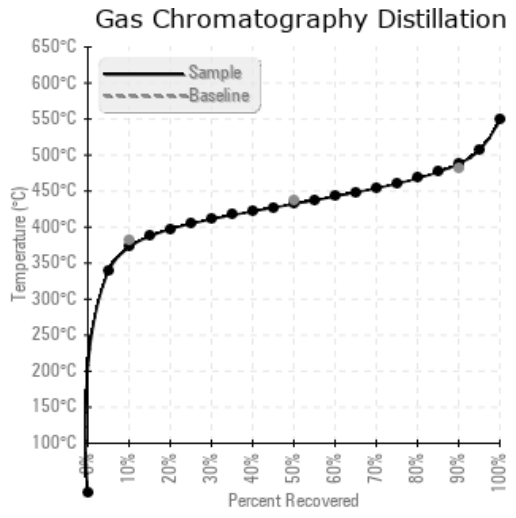
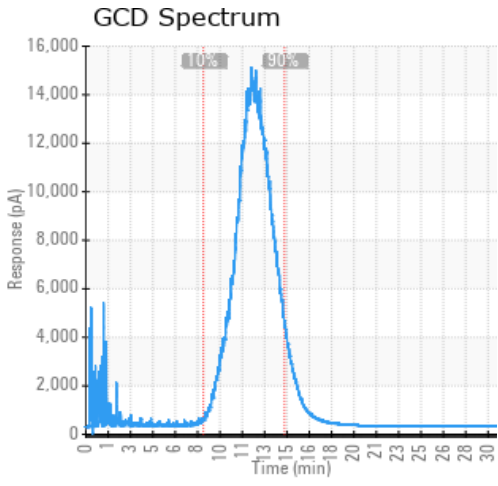
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
09/21/22	09/26/22	12.0m	FILTER POT	372 / 189	20.7	24.0	0.01	0.046	702 / 372	810 / 432	910 / 488	4.45
08/10/22	08/23/22	8.0m	SAMPLE QUILL	410 / 210	40.3	30.6	0.16	0.058	715 / 379	812 / 433	912 / 489	2.15
<b>Baseline Data</b>				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





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
09/21/22	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/10/22	10	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				0	

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



## Historical Comments

08/10/22	Sample results indicate the fluid is in suitable condition for continued service. Note fluid viscosity is slightly reduced from new. Please re-sample in 6 months to build a trend. Visc @ 40°C is abnormally low.

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