

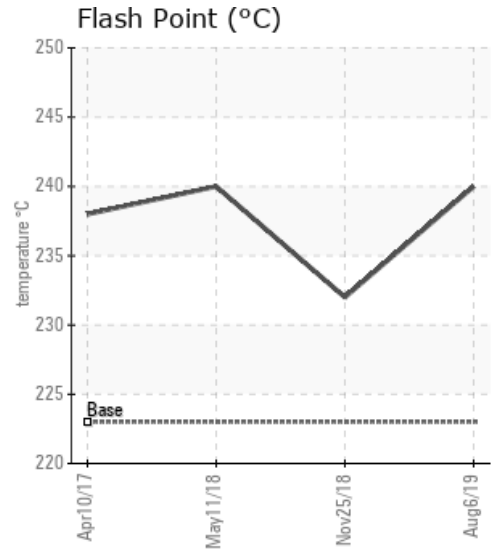
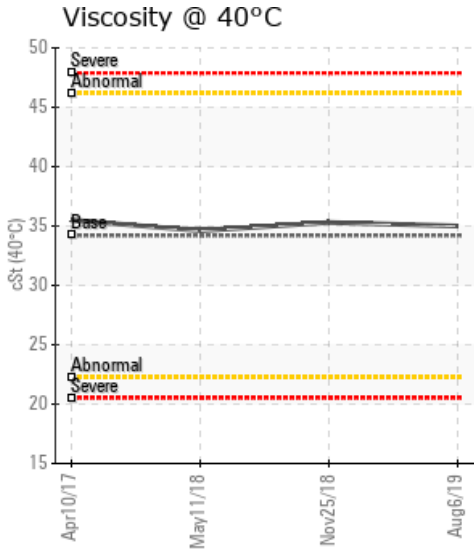
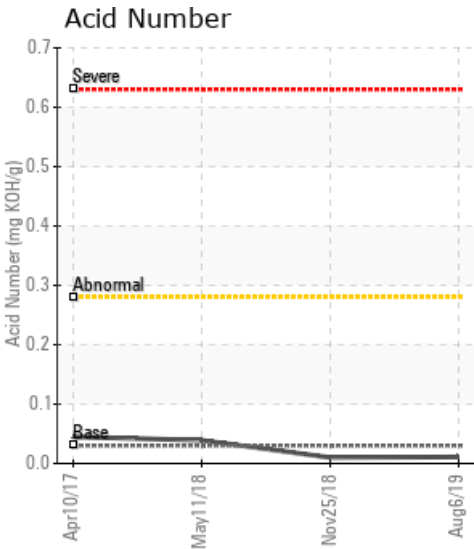
[Orlen Upstream Canada / 16-7-63-5w6] 5510/5610 HEAT MEDIUM

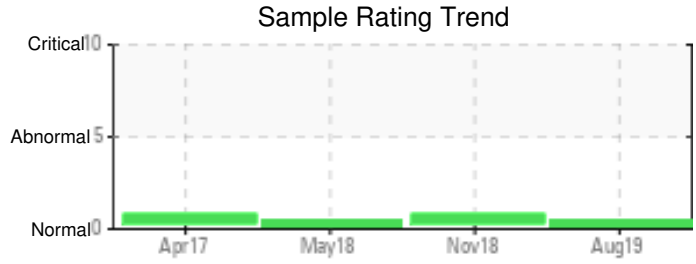
Customer: PTRHTF20175	System Information	Sample Information
QUADRA CHEMICALS 7802 98 STREET CLAIRMONT, AB T0H 0W0 Canada Attn: Quadra Samples Tel: E-Mail: quadra_samples@quadra.ca	System Volume: 10000 ltr Bulk Operating Temp: 374F / 190C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: RUSHTON	Lab No: 02305913 Analyst: Clinton Buhler Sample Date: 08/06/19 Received Date: 08/30/19 Completed: 11/29/19 Clinton Buhler Clinton.Buhler@PetroCanadaLSP.com

Recommendation: Sample results indicate that the heat transfer fluid is suitable for continued service. Please re-sample in 12 months

Comments:

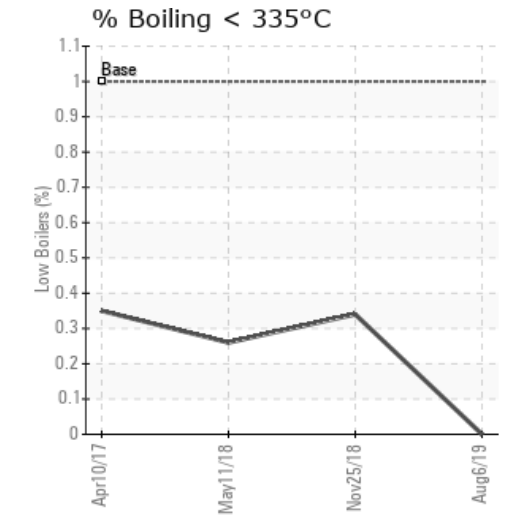
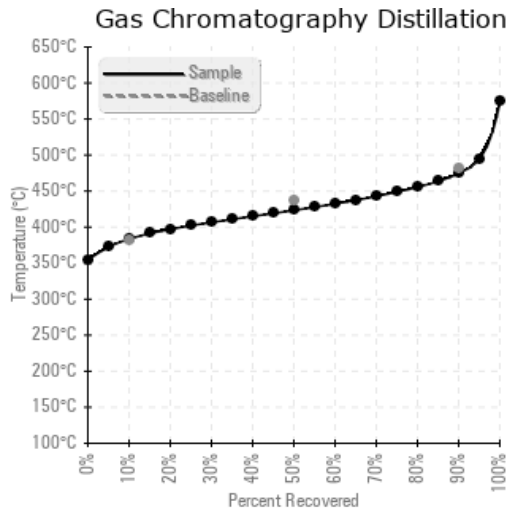
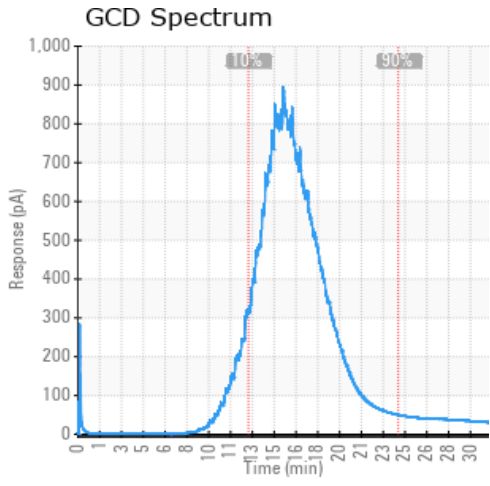
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/06/19	08/30/19	28m	SIGHTGLASS	464 / 240	8.6	35.0	0.011	0.160	722 / 383	794 / 423	886 / 475	0.00
11/25/18	12/14/18	18m		450 / 232	14.9	35.3	0.01	0.055	728 / 386	815 / 435	920 / 493	0.34
05/11/18	05/30/18	12m	ORLEN UPSTREAM	464 / 240	11.5	34.6	0.039	0.030	726 / 385	814 / 435	903 / 484	0.26
04/10/17	05/26/17	14m	REBOILER HIGH POINT	460 / 238	32.3	35.5	0.045	0.048	725 / 385	817 / 436	921 / 494	0.35
Baseline Data				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		
08/06/19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
11/25/18	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/11/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/10/17	0	0	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				0			

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



Historical Comments	
11/25/18	sample results indicate that the fluid is suitable for continued service. Please re-sample in 12 months (GCD) 90% Distillation Point is marginally high.
05/11/18	Sample results indicate that fluid is suitable for continued service. Re-sample in 12 months.
04/10/17	90% distillation point increase can indicate oxidation of the heat transfer fluid. Ensure blanket gas system is operational to reduce the fluid interface with oxygen. Re-sample fluid in 6-12 months (GCD) 90% Distillation Point is marginally high.

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