

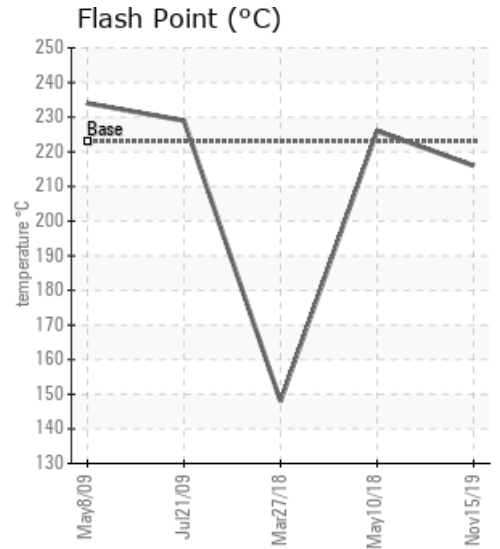
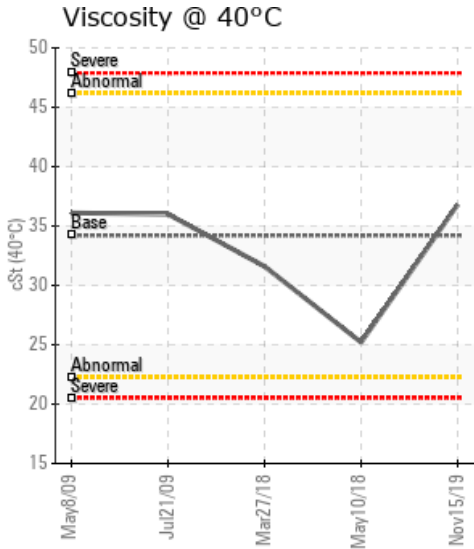
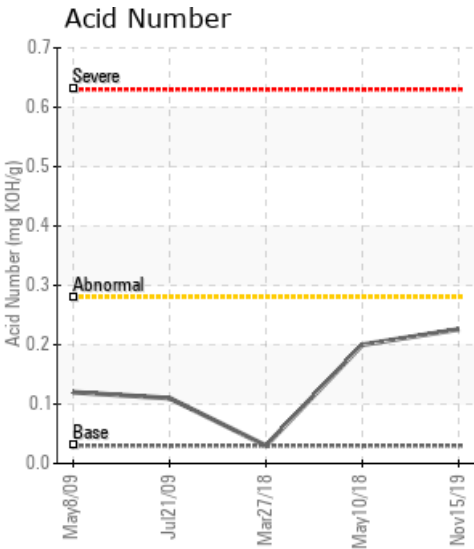
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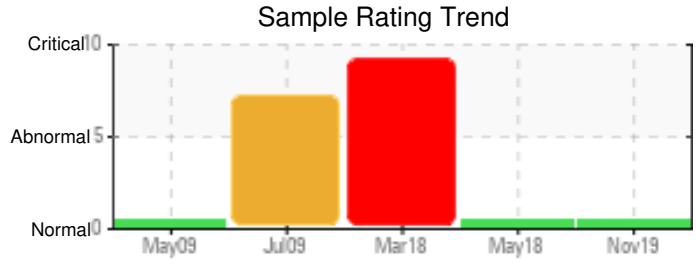
Customer: PTRHTF20028	System Information	Sample Information
ENERCHEM INTERNATIONAL P.O. BOX 1492 P.O. BOX 1492 SUNDRE, AB T0M 1X0 CANADA Attn: Will Clark Tel: (403)638-3795 E-Mail: wclark@enerchem.com	System Volume: 7800 ltr Bulk Operating Temp: 545F / 285C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: THERMO DESIGN ENG.	Lab No: 02321732 Analyst: Kevin McDermott Sample Date: 11/15/19 Received Date: 11/21/19 Completed: 11/25/19

Recommendation: Fluid condition is excellent. Suggest submitting samples of used fluid annually to proactively monitor fluid condition.

Comments:

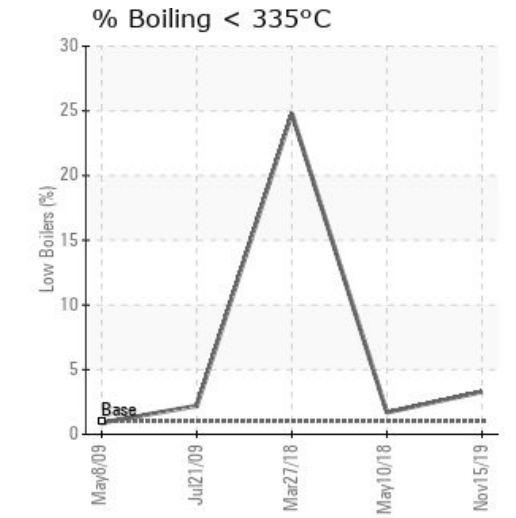
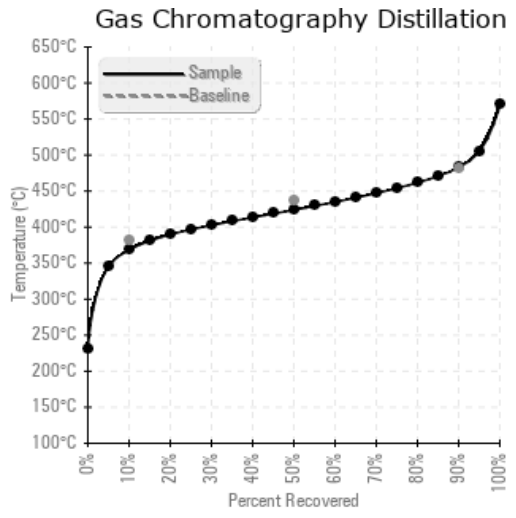
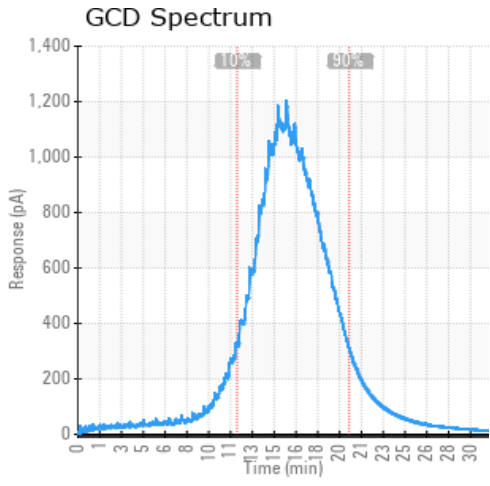
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/15/19	11/21/19	0y	REBOILER	421 / 216	11.7	36.8	0.226	0.288	695 / 368	795 / 424	901 / 483	3.29
05/10/18	05/16/18	0y		439 / 226	175.5	25.2	0.2	0.017	693 / 367	779 / 415	893 / 479	1.69
03/27/18	04/04/18	0y		298 / 148	13.0	31.6	0.03	2.65	435 / 224	771 / 411	916 / 491	24.79
07/21/09	07/21/09		WATER IS EVCESSIVELY	444 / 229	1082	36	0.11		687 / 364		892 / 478	2.2
05/08/09	05/08/09			453 / 234	41	36.1	0.12	0.1	712 / 378		896 / 480	0.9
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
11/15/19	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/10/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
03/27/18	71	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1	0	1	0
07/21/09	254	0	0	0	0	0	0	0	0	0	4	3		0	0		5		0	2	0	6	5	
05/08/09	135	0	0	0	0	1	0	0	0	0	1	0		0	0		2		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	
05/10/18	Fluid is in excellent condition. The viscosity is lower than expected, likely from traces of solvent / flushing fluid during the cleaning process. Suggest a re-sample in 3 months to ensure things are on the right track.
03/27/18	The fluid is in poor condition due to thermal cracking. The best option is to perform a system cleaning and charge with new fluid. Alternatively, a partial sweetening of the fluid can be a lower cost but temporary option assuming the cause of thermal degradation is addressed. Pentane Insolubles levels (solids content) severely high. (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low.
07/21/09	
05/08/09	

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