

### [3-26-33-6W5] H-370

**Customer: PTRHTF20028**  
 ENERCHEM INTERNATIONAL  
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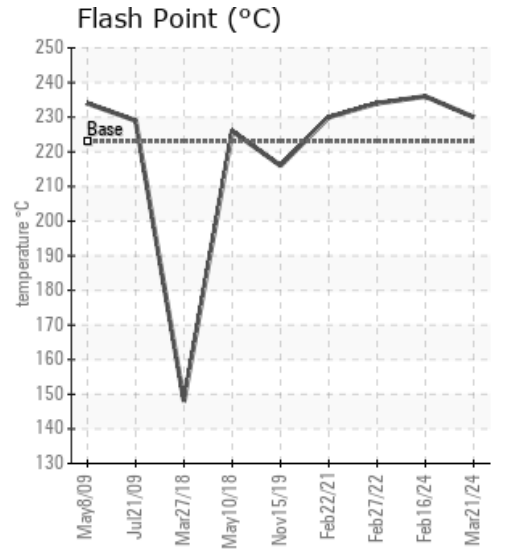
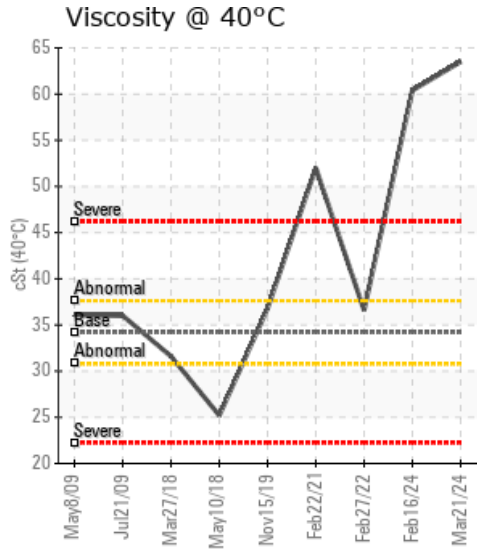
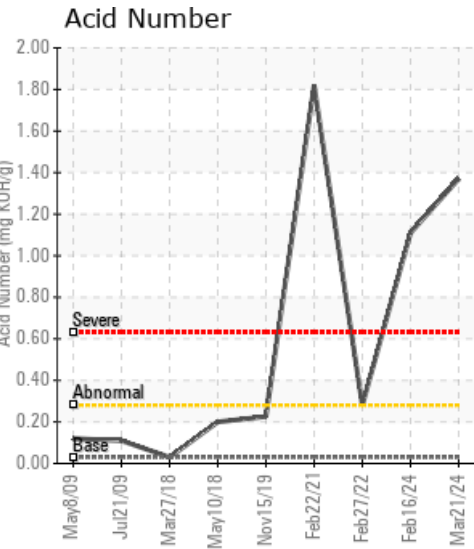
**System Information**  
 System Volume: 7800 ltr  
 Bulk Operating Temp: 545F / 285C  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA PETRO-THERM  
 Make: THERMO DESIGN ENG.

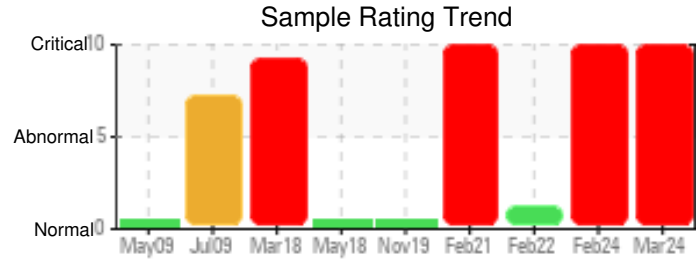
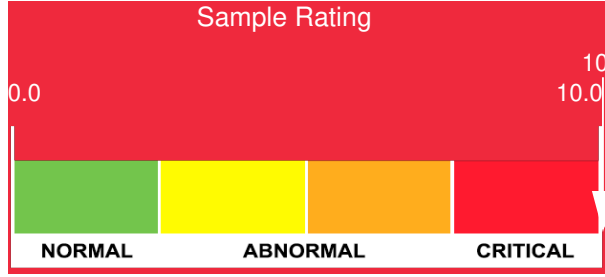
**Sample Information**  
 Lab No: 02625471  
 Analyst: Lyle Dach  
 Sample Date: 03/21/24  
 Received Date: 03/28/24  
 Completed: 04/02/24  
 Lyle Dach  
 lyle.dach@HFSinclair.com

**Recommendation:** This second sample confirms that the fluid is severely degraded, likely due to oxidation which happens when hot fluid is exposed to air. As the fluid oxidizes it will increase the viscosity and acidity. The high acid number is causing corrosive wear which is leading to high iron, PQ and pentane insolubles. The system will need to be cleaned internally and fluid replaced.

**Comments:** Iron ppm levels are severe. PQ levels are severe. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high.

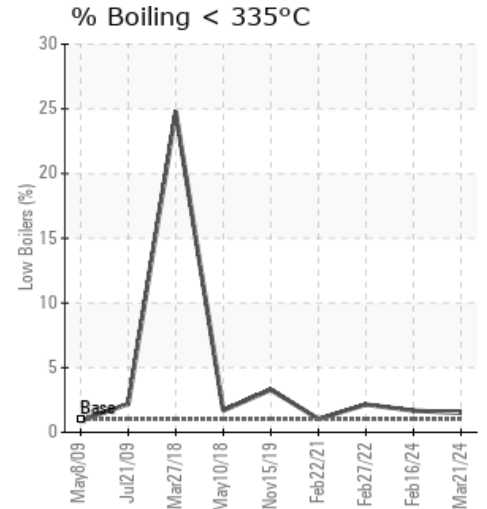
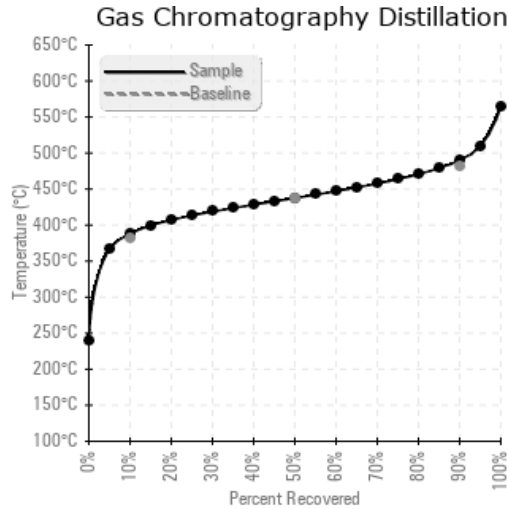
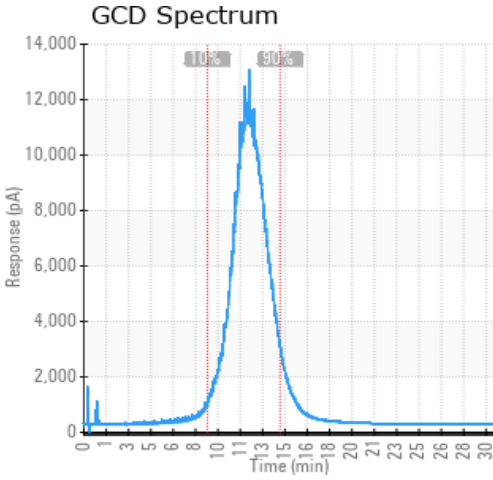
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/21/24	03/28/24	3.0y		446 / 230	59	63.5	1.37	1.33	730 / 388	820 / 438	914 / 490	1.51
02/16/24	02/21/24	5.0y		457 / 236	104	60.4	1.11	4.00	728 / 387	819 / 437	916 / 491	1.67
02/27/22	03/09/22	2.0y	T1 bldg by temp valv	453 / 234	31.2	36.6	0.28	0.261	724 / 385	816 / 436	908 / 487	2.15
02/22/21	03/01/21	0.0y		446 / 230	306.3	52.0	1.82	3.81	728 / 387	818 / 437	924 / 496	1.03
11/15/19	11/21/19	0.0y	REBOILER	421 / 216	11.7	36.8	0.226	0.288	695 / 368	795 / 424	901 / 483	3.29
<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
03/21/24	613	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	1	0	2	2
02/16/24	787	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	7	0	0	0	2	0	3	3
02/27/22	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
02/22/21	210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0
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
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

02/16/24	If this is a representative sample of the whole system the fluid is severely degraded due to oxidation which happens when hot fluid is exposed to air. The high solids content indicates that the system will be fouled with acidic carbon deposits. Resample to ensure this sample is accurate, if the system is equipped with pumps sample off the discharge of the pumps. If a low point drain must be used ensure the point is flushed well and the sample is representative of the whole system. If the fluid is degraded to these levels the system will need to be cleaned internally and fluid replaced. Iron ppm levels are severe. PQ levels are severe. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high.
02/27/22	Fluid condition has improved significantly and is acceptable for continued use. Acid number is still slightly high but is acceptable, ensure blanket gas is on and functioning properly. Resample in 12 months.
02/22/21	Fluid is severely degraded due to oxidation which happens when hot fluid is exposed to air. The high solids content indicates that the system will be fouled with acidic carbon deposits. System will need to be cleaned internally and fluid replaced.
11/15/19	Fluid condition is excellent. Suggest submitting samples of used fluid annually to proactively monitor fluid condition.