

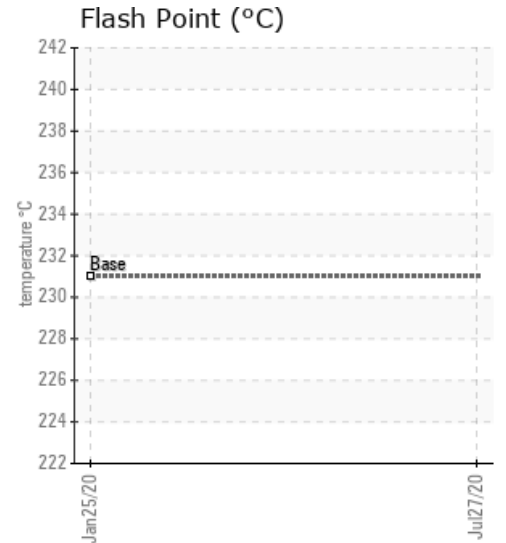
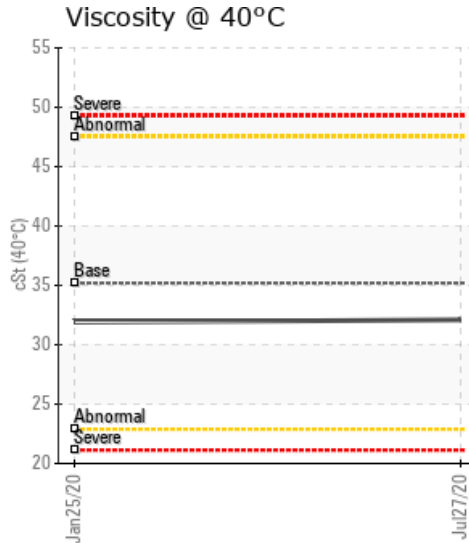
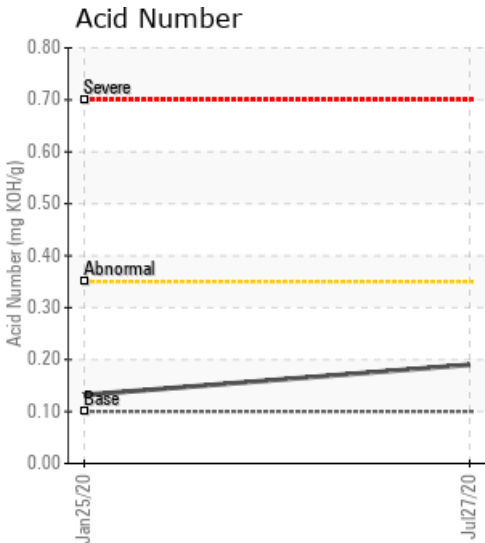
## THERMAL OIL SYSTEM

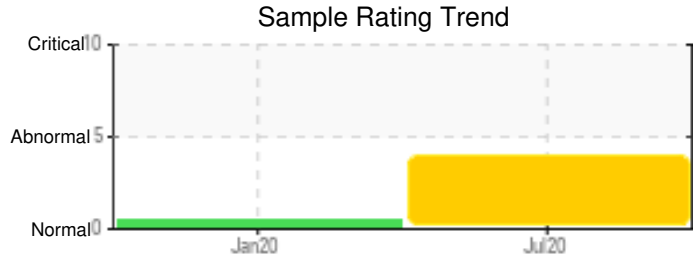
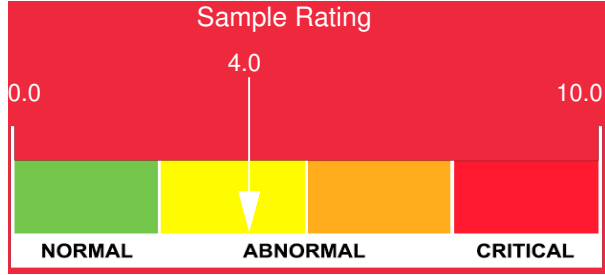
Customer: PTRHTF30156	System Information	Sample Information
M/T HINCH SPIRIT IMO No. 9508940 Toronto, ON . Canada Attn: Chief Engineer Tel: E-Mail: his.en@mckeil.com	System Volume: 5500 ltr Bulk Operating Temp: Not Specified Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: AALBORG	Lab No: 02368167 Analyst: Behshad Sabah Sample Date: 07/27/20 Received Date: 08/04/20 Completed: 09/08/20 Behshad Sabah behshad.sabah@hollyfrontier.com

Recommendation: the oil sample test results look ok. i think you are topping up the Castrol Perfecto HT 5 with Calflo HTF. as result, the Sulfur PPM is going down from original oil ( Perfecto HT 5) as we do not have this additive in our formulation. some water in the system but with nature of your applicaiton ( Ship), it is not that high. no action at this point is necessary.

Comments: Water contamination levels are marginally high. ppm Water contamination levels are marginally high. (GCD) 90% Distillation Point is abnormally low. Magnesium ppm levels are notably high. Calcium, phosphorus and sulfur ppm levels are notably high.

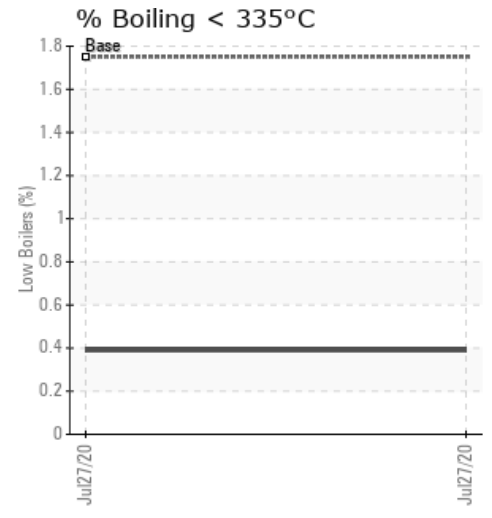
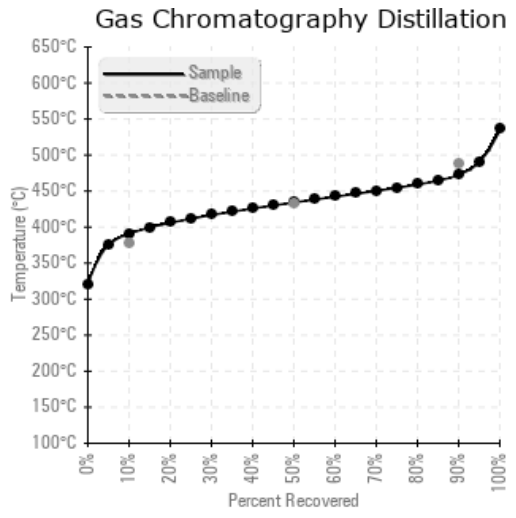
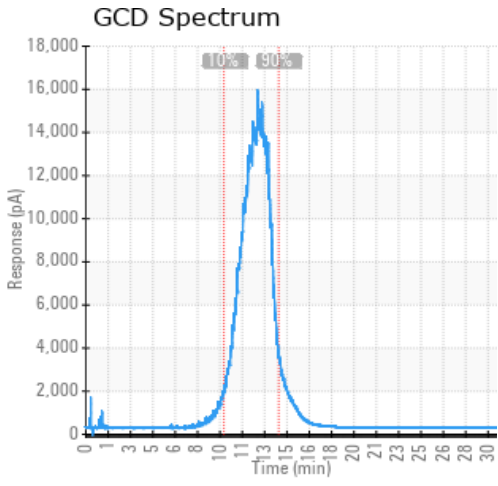
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/27/20	08/04/20	10.0y		450 / 232	431.9	32.1	0.19	0.127	735 / 391	814 / 434	883 / 473	0.39
01/25/20	02/18/20	0.0y				31.9	0.132					
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75





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
07/27/20	201	0	0	0	1	0	0	0	0	0	1	16	9	0	0	0	2	0	0	28	33	0	34	3
01/25/20	138	0	0	0	0	0	0	0	0	0	3	15	9	0	0	0	1	0	0	21	31	0	16	3
Baseline Data			0	0						0			0	0				0	0				280	

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



Historical Comments	
01/25/20	Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. Lubritest recommends using HTTFL sample kits for heat transfer fluids. Please contact us at 1-800-268-2131 and provide a purchase order for \$245 + HST in order to conduct additional testing (boiling points @ 10%, 50%, and 90%, percent boiling < 335°C, and solids) to determine the suitability for continued use. All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The condition of the fluid is acceptable for the time in service (unconfirmed).

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