

KAONA FUTHER 4

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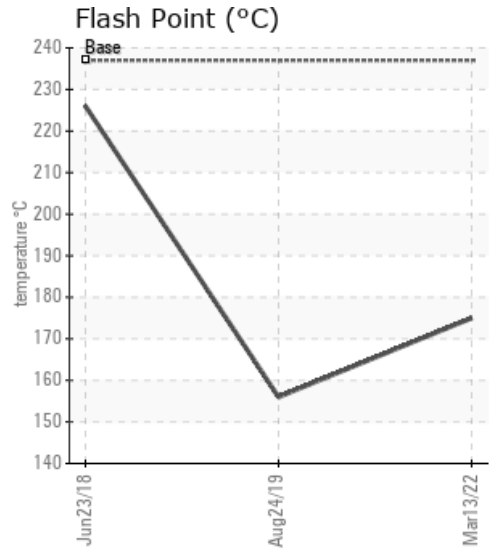
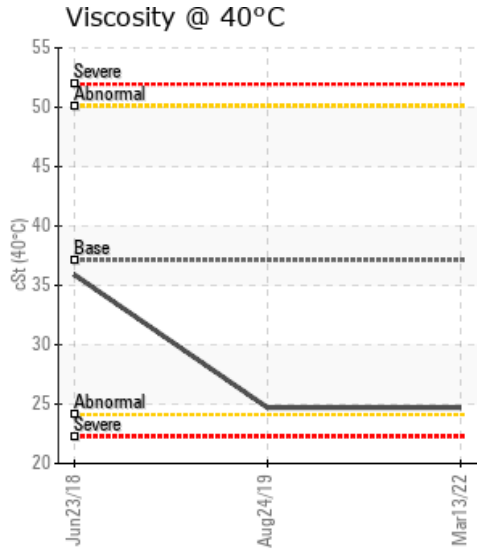
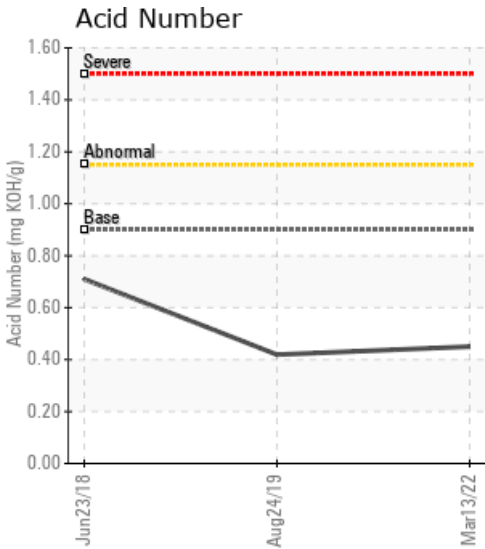
System Information
 System Volume: 4400 ltr
 Bulk Operating Temp: 545F / 285C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID
 Make:

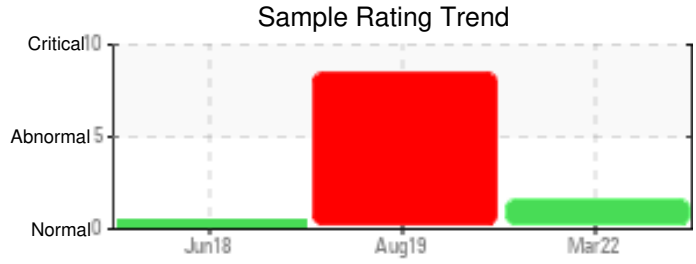
Sample Information
 Lab No: 02480437
 Analyst: Philip Riley
 Sample Date: 03/13/22
 Received Date: 03/30/22
 Completed: 04/05/22
 Philip Riley
 philip.riley@hollyfrontier.com

Recommendation: Has this oil been changed since the previous sample? If so, was there a clean and flush? The previous sample was worse in terms of flash point, evidence of cracking, GCD distillation points, low viscosity. However, the current situation the above mentioned physical characteristics remain off spec and of potential consequence. Please feedback what has happened with this fluid, if it was changed then the change probably had no clean and flush and there is carryover from previous fluid. If the fluid was vented to recover flash point for example, it has partially done this, but you need to look to change this fluid with a clean and flush

Comments: COC Flash Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high.

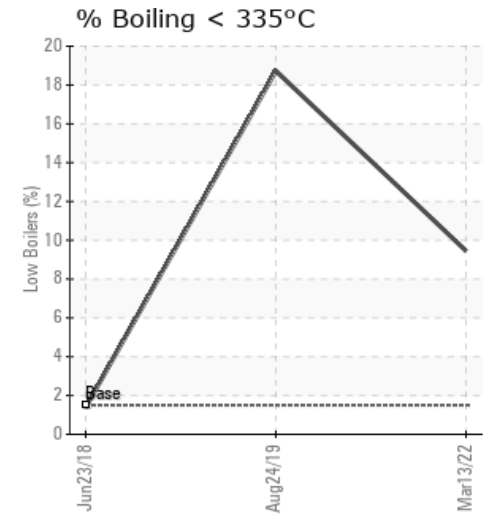
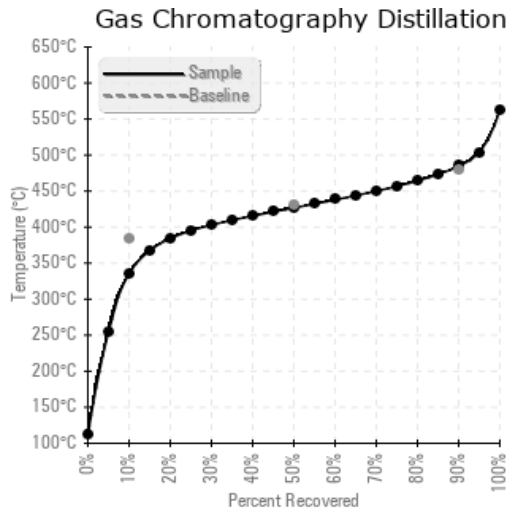
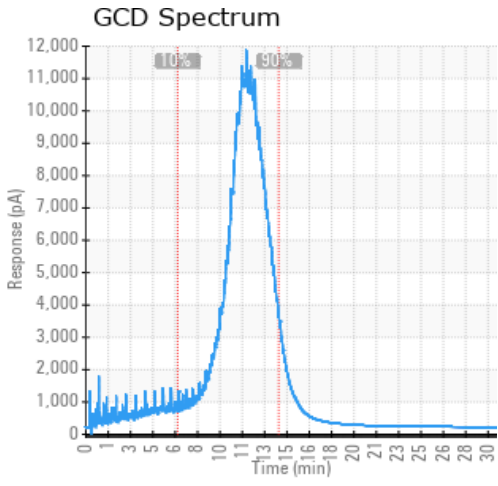
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/13/22	03/30/22	8.0y	SUPPLY RETURN	347 / 175	53.5	24.7	0.45	0.048	636 / 336	800 / 427	904 / 485	9.45
08/24/19	10/04/19	1.0y	SUPPLY RETURN	313 / 156	9.8	24.7	0.419	0.055	461 / 238	790 / 421	912 / 489	18.73
06/23/18	07/13/18	0.0y	RETURN	439 / 226	0.00	35.9	0.71	0.007	702 / 372	800 / 426	904 / 485	1.40
Baseline Data				459 / 237		37.12	0.90		721 / 383	807 / 431	892 / 478	1.5





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
03/13/22	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0
08/24/19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4
06/23/18	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	207	0
Baseline Data			0	0						0			0	0				0	0				230	

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



Historical Comments	
08/24/19	Sample rating very poor. Viscosity loss, flash point extremely low, evidence of fluid cracking on GC Distillation. Recommend a fluid change and resample following the change. Please inspect system and consider a clean and flush (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) 90% Distillation Point is marginally high.
06/23/18	The current fluid has a normal viscosity, flash point, and distillation points. There is minimum solids or water in the fluid. Please continue to run the fluid and take a sample in 12 months.

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