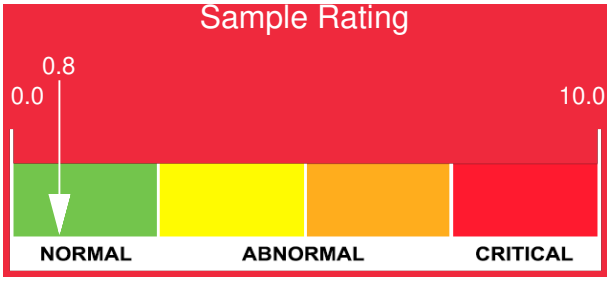
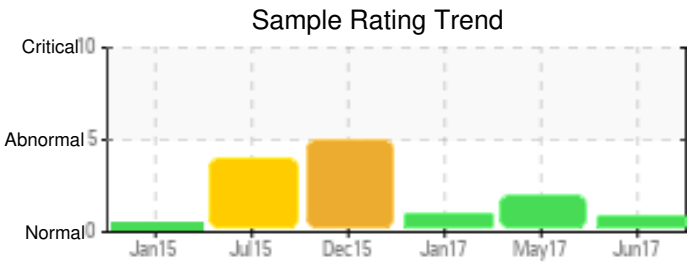
PETRO-CANADA LUBRICANTS





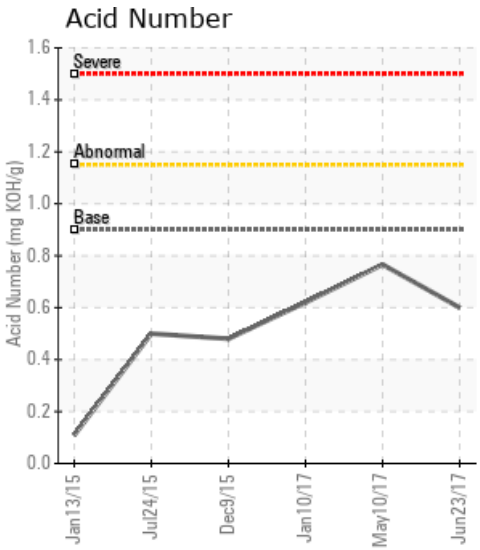
#3 COOKER (I-854-1-0140)

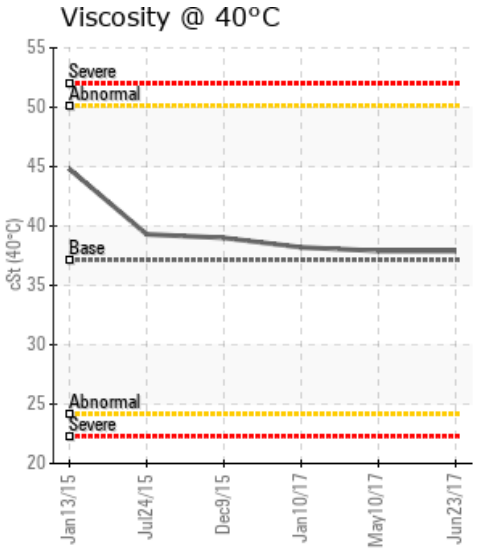
Customer: PTRHTF10156	System Information	Sample Information
INGREDION 1515 SOUTH DROVER ST INDIANAPOLIS, IN 46221 USA Attn: Randy Ward Tel: (317)656-2247 E-Mail: Randy.Ward@ingredion.com	System Volume: 200 gal Bulk Operating Temp: 400F / 204C Heating Source: Blanket: Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID Make: HEAT EXCHANGER/TRAN	Lab No: 02198370 Analyst: Yvette Trzcinski Sample Date: 06/23/17 Received Date: 02/13/18 Completed: 03/01/18

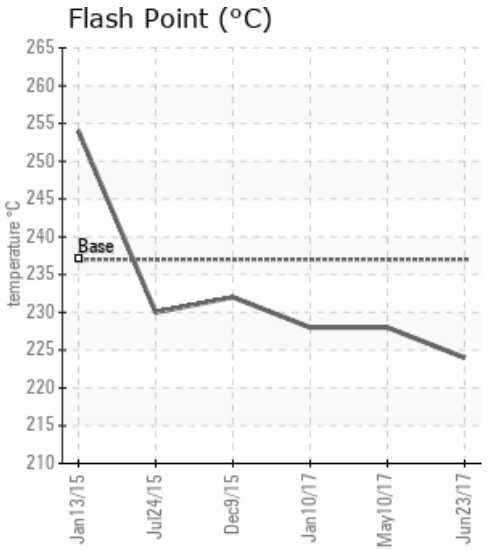
Recommendation: very little insolubes and the viscosity and acid number suggest the fluid is acceptable for continued use. This sample is dated June 2017 I recommend sending in new samples.

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	%
06/23/17	02/13/18	6m		435 / 224	13.4	37.9	0.60	0.014	747 / 397	825 / 440	924 / 496	0.00
05/10/17	05/16/17	6m	DRAIN PORT	442 / 228	12.9	37.9	0.766	0.033	732 / 389	831 / 444	965 / 518	0.28
01/10/17	01/23/17	7m		442 / 228	7.6	38.2	0.62	0.026	739 / 393	841 / 449	984 / 529	0.13
12/09/15	04/19/16	6m	HOT OIL HEAT EXCHNGR	450 / 232	9.4	39.0	0.48	0.034	819 / 437	902 / 483	991 / 533	0.00
07/24/15	08/06/15	0m	PAST THE STRAINER	446 / 230	5.2	39.3	0.50	0.037	745 / 396	878 / 470	1007 / 542	0.24
01/13/15	01/30/15	0m	AT PUMP	489 / 254	17.2	44.8	0.109	0.035	894 / 479	942 / 506	1052 / 567	0.09
Baseline Data				459 / 237		37.12	0.90		721 / 383	807 / 431	892 / 478	1.5







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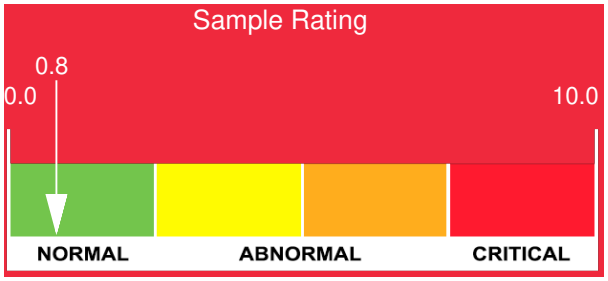
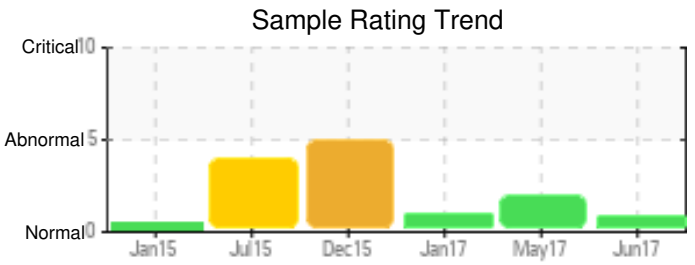
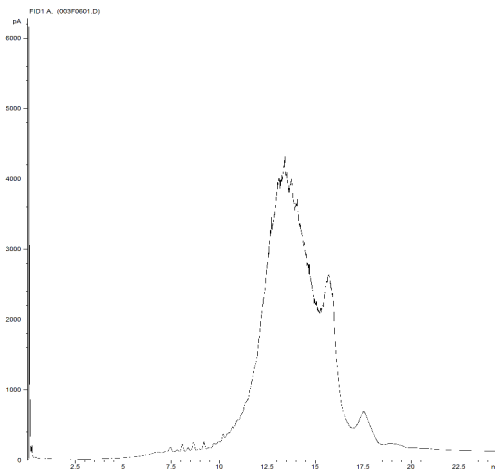


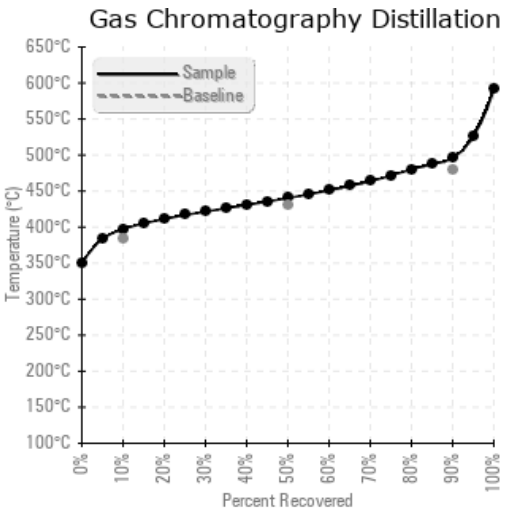


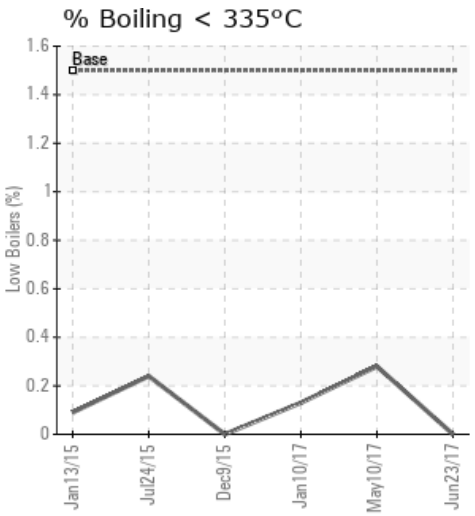
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
06/23/17	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	176	0
05/10/17	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	188	0
01/10/17	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	172	0
12/09/15	4	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	130	6
07/24/15	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	134	4
01/13/15	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Baseline Data			0	0						0			0	0					0				230	

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

GCD Spectrum







Historical Comments

05/10/17	There appears to be slight addition to the system viscosity closer to the Purity FG HTF. Sediment is low and flash point remaining constant. Resample in 3-6 months.
01/10/17	The lightening in color, the reduction in viscosity and other properties slowly moving towards Purity FG HTF, we notice the fluid is still a mixture of Interlube and Purity FG HTF at an approximate ratio of 15% - 85% respectively. The fluid condition is good with minimal amount of foreign elements, solids and water contamination. The flash point remains strong. No action deemed necessary at this time, just re-sample in 6 months for normal monitoring. (GCD) 90% Distillation Point is severely high. (GCD) 50% Distillation Point is marginally high.
12/09/15	Considering the sample was submitted much later than it was taken, we recommend to send another set of samples as they were monitored every 4 months anyways. The GC profile and additive content still shows high presence of Interlube. The oil condition is suitable for further service. (GCD) 10% Distillation Point is severely high. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high.
07/24/15	Some of the properties are flagged because they are compared to fresh Purity FG HTF and doesn't consider the system is a mixture of about 50/50 with Interlube. There is a steady change in properties to show the increasing amount of Purity FG HTF in the system. The overall condition of the fluid appears to be good based on the results with metals, water and insoluble solids at low levels. Please re-sample at next scheduled interval. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high.
01/13/15	Sample is showing signs of oxidation (high GCD & viscosity values) which will lead to less effcient service of the system and sludge build-up. It is also possible that the fluid has some contamination with a lower viscosity fluid. Re-sample in 6 months to monitor the fluid health. (GCD) 10% Distillation Point is severely high. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high. COC Flash Point is abnormally high. Visc @ 40°C is abnormally high.