

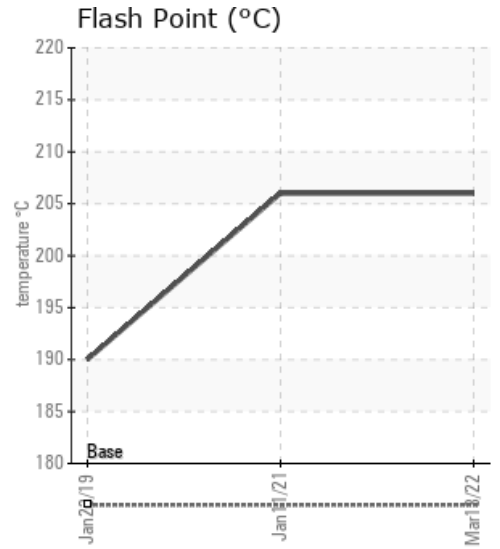
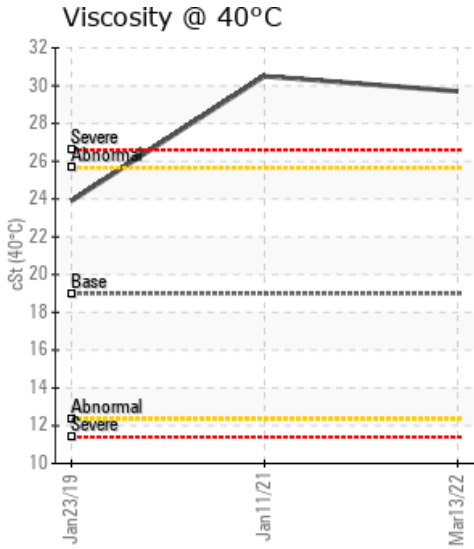
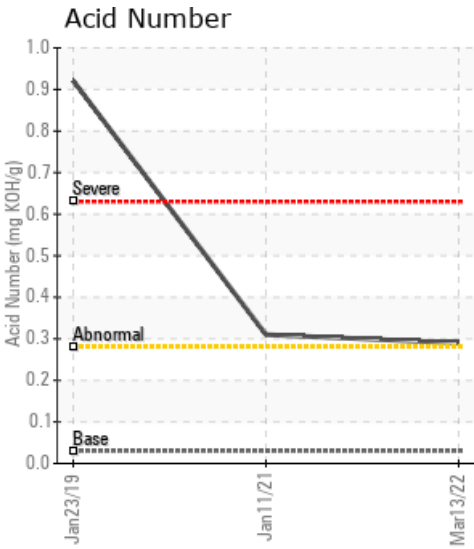
EAIM ESAN LINE 1

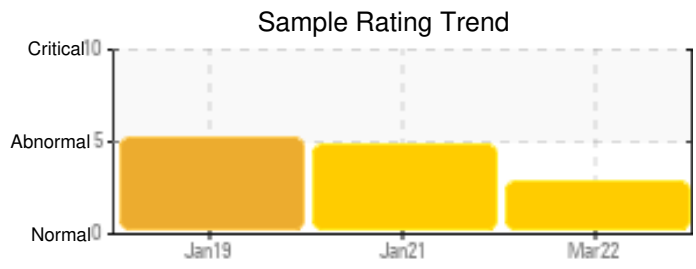
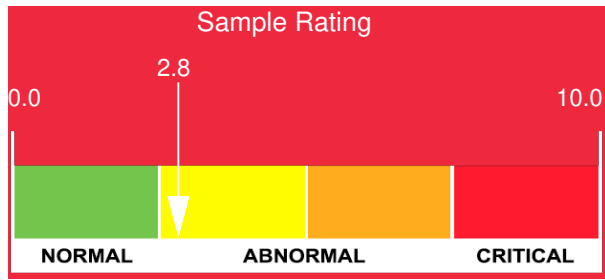
Customer: PTRHTF60010	System Information	Sample Information
SYNLUBE INTERNATIONAL CO LTD 76/1 MOO.7 THACHIN MUANG SAMUTSAKHON, 74000 THAILAND Attn: CHERNPORN CHOBKUI Tel: 034421290 E-Mail: chernporn@synlube.co.th	System Volume: 11275 ltr Bulk Operating Temp: 554F / 290C Heating Source: Blanket: Fluid: EASTMAN THERMINOL 55 Make:	Lab No: 02480436 Analyst: Philip Riley Sample Date: 03/13/22 Received Date: 03/30/22 Completed: 04/05/22 Philip Riley philip.riley@hollyfrontier.com

Recommendation: Competitor product and unfamiliar with the chemistry. Highlights increase in viscosity and acid number, which is evidence of breakdown. The oil thickening will require more heat to be used to get the same out, the flow will be worse and it will accelerate the degradation of the fluid.

Comments: (GCD) 90% Distillation Point is severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high. COC Flash Point is marginally high.

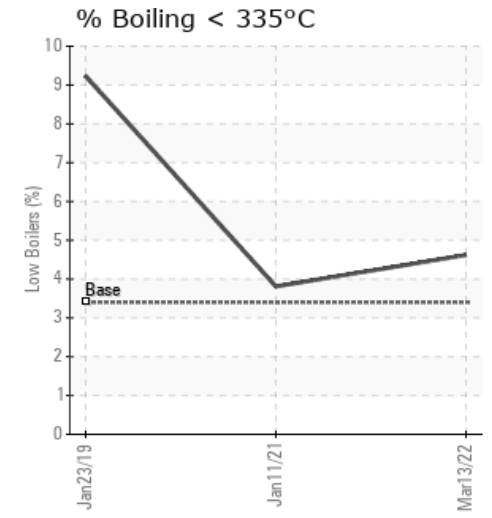
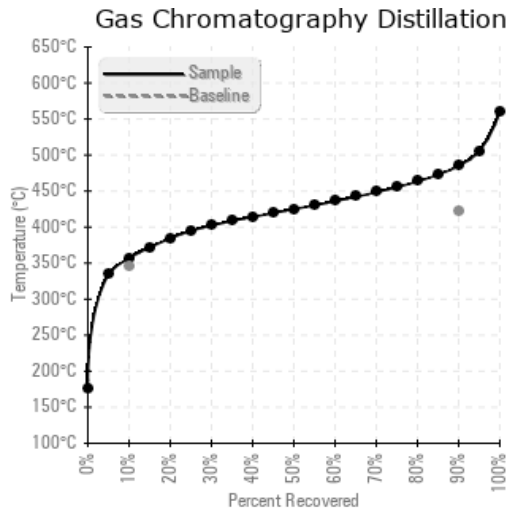
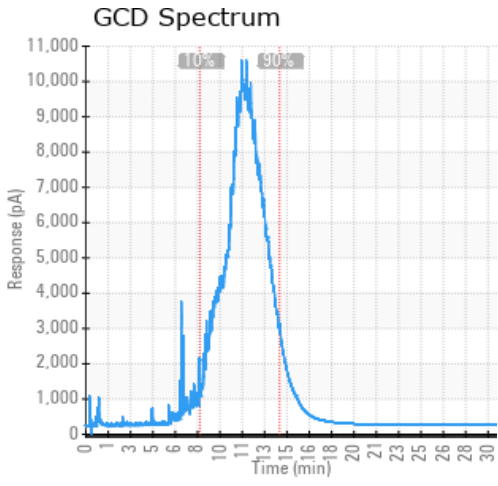
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/13/22	03/30/22	27.0m	supply return	403 / 206	23.8	29.7	0.29	0.104	674 / 357	797 / 425	905 / 485	4.62
01/11/21	01/25/21	15.0m		403 / 206	19.5	30.5	0.31	0.177	680 / 360	799 / 426	905 / 485	3.81
01/23/19	02/27/19	9.0m	SUPPLY ROOM	374 / 190	49.7	23.9	0.921	0.148	636 / 335	693 / 367	835 / 446	9.23
Baseline Data				349 / 176		19.0	0.03		655 / 346		790 / 421	3.40





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	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	
01/11/21	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	0
01/23/19	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	
01/11/21	Unfamiliar with chemistry of competitor products and cannot comment with full confidence on actual results. However, it can be seen from the GCD Distillation there is evidence of fluid thermal cracking. Other parameters are also off spec in relation to viscosity, GCD boiling range, acid number
01/23/19	The current fluid has OK viscosity and flash point. The particle or water contamination are all quite low. However, acid number has been increased substantially from the new fluid base line, indicating the oil has severe oxidation over the 9 years operation at 250C bulk temperature conditions. The oil oxidation by-product typically causes the metal corrosion and form soft and hard carbon deposits inside the boiler and piping, so that the system heat transfer efficiency is reduced. Please plan a fluid change and continue to monitor the fluid conditions in the future. Acid Number (AN) is high. (GCD) 90% Distillation Point is high.

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