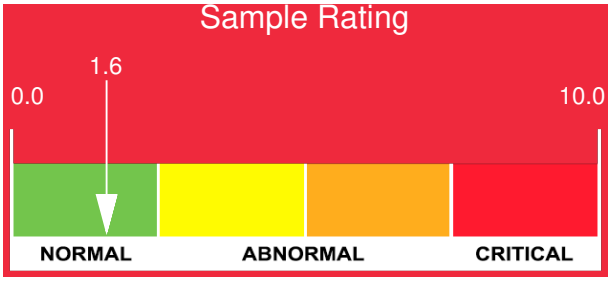
PETRO-CANADA LUBRICANTS



SUPPLY CARGILL MEAT THAILAND

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: 20910 ltr Bulk Operating Temp: 554F / 290C Heating Source: Blanket: Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID Make: WANSON	Lab No: 02283130 Analyst: Yutong Gao Sample Date: 05/02/19 Received Date: 05/03/19 Completed: 05/22/19

Recommendation: The current fluid has very low flash point and low viscosity at 40C because of the severe thermal cracking. The low boiler needs to be released by effective system venting. However the fluid distillation points are still adequate. Please confirm if the representative sample was taken at the plant? The sample needs to be taken at the sample place after the oil is well circulated.

Comments: COC Flash Point is severely low.

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	%
05/02/19	05/03/19	36m		277 / 136	8.5	26.1	0.241	0.061	685 / 363	803 / 428	897 / 481	5.37
02/01/19	02/08/19	0m		309 / 154	17.7	25.8	0.190	0.023	620 / 327	773 / 412	871 / 466	10.77
08/25/18	11/27/18	31m		309 / 154	12.2	26.4	0.08	0.023	598 / 314	728 / 386	821 / 439	15.22
08/25/18	09/05/18	28m	SUPPLU	363 / 184	11.7	28.4	0.10	0.025	685 / 363	805 / 430	902 / 483	5.29
05/23/18	06/12/18	25m		336 / 169	12.7	30.3	0.17	0.048	677 / 359	781 / 416	873 / 467	4.51
02/04/18	02/26/18	22m		313 / 156	0.00	27.7	0.276	0.036	665 / 352	769 / 409	890 / 477	4.38
11/01/17	11/14/17	19m		302 / 150	10.7	26.9	0.13	0.031	674 / 357	805 / 430	897 / 481	6.43
10/13/17	10/24/17	19m	SUPPLY	277 / 136	0.1	26.8	0.252	0.015	668 / 353	798 / 426	892 / 478	6.82
08/10/17	08/22/17	17m		309 / 154	9.9	22.0	0.19	0.040	675 / 357	799 / 426	895 / 480	6.22
04/21/17	05/01/17	12m		349 / 176	22.8	28.7	0.354	0.039	687 / 364	806 / 430	905 / 485	4.84
03/26/17	04/03/17	12m		334 / 168	12.5	28.5	0.17	0.058	682 / 361	803 / 428	899 / 482	5.55
11/22/16	12/02/16	7m		324 / 162	10.7	29.1	0.25	0.040	692 / 366	807 / 431	905 / 485	4.32
10/31/16	11/14/16	6m		331 / 166	32.5	29.3	0.28	0.068	695 / 368	808 / 431	902 / 483	4.11
07/07/16	07/13/16	3m		399 / 204	40.8	32.7	0.35	0.075	706 / 375	807 / 430	899 / 481	2.29
04/22/16	04/27/16	7m	SUPPLY	388 / 198	27.5	27.7	0.40	0.038	708 / 376	808 / 431	900 / 482	2.44
04/13/16	04/27/16	7m	SUPPLY	248 / 120	15.6	25.4	0.22	0.035	673 / 356	805 / 430	912 / 489	6.57
04/01/16	04/04/16	35m	SUPPLY	270 / 132	17.9	26.3	0.255	0.016	651 / 344	794 / 423	905 / 485	8.18
01/27/16	02/02/16	33m	SUPPLY	306 / 152	1.7	27.1	0.270	0.119	686 / 363	802 / 428	899 / 482	4.40
01/12/16	01/19/16	33m	SUPPLY	306 / 152	18.9	27.7	0.294	0.050	676 / 358	807 / 430	915 / 491	6.22
09/06/15	09/10/15	29m	SUPPLY	338 / 170	6.2	27.0	0.281	0.045	688 / 365	808 / 431	911 / 489	4.91
06/20/15	06/30/15	26m	SUPPLY	320 / 160	6.9	28.2	0.29	0.078	705 / 374	807 / 431	896 / 480	2.21
04/22/15	05/01/15	24m		313 / 156	22.9	28.3	0.22	0.067	693 / 367	811 / 433	907 / 486	4.54
02/15/15	02/20/15	22m	SUPPLY	316 / 158	20.3	28.3	0.27	0.077	697 / 370	823 / 439	916 / 491	4.62
01/31/15	02/06/15	21m	SUPPLY	313 / 156	13.2	27.5	0.26	0.059	677 / 358	810 / 432	906 / 486	6.27


20m

SUPPLY

0.34

0.058

0m

SUPPLY

16.6

27.4

0.29

0.079

0m

SUPPLY AND RETURN

0.10

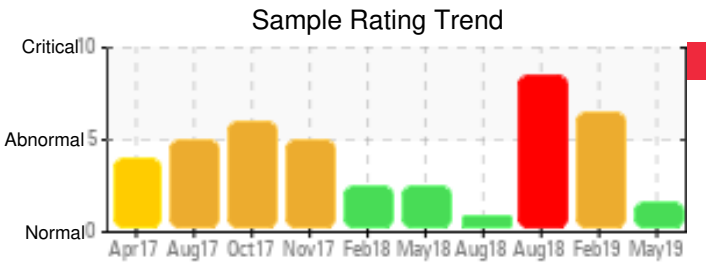
0.061

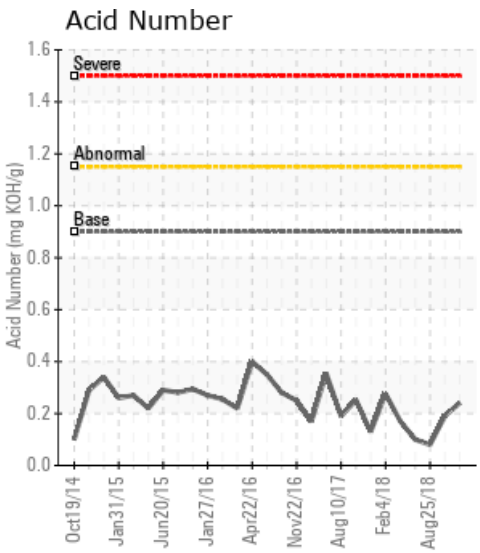
0.00

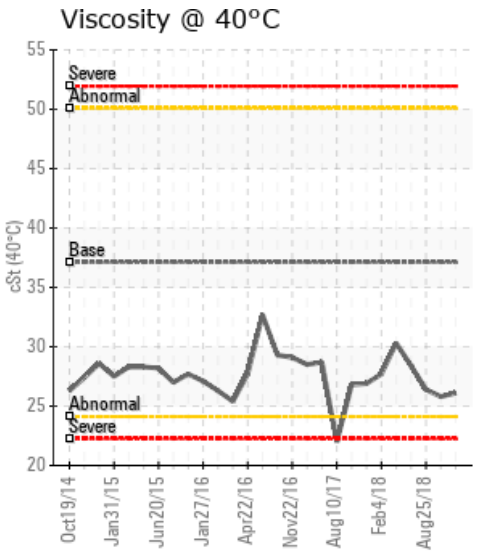
Baseline Data

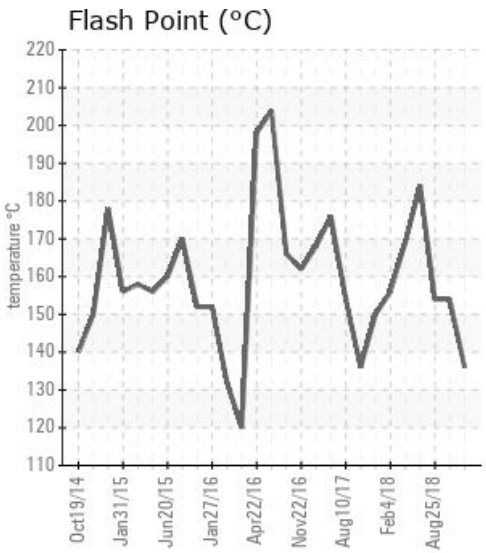
37.12

0.90









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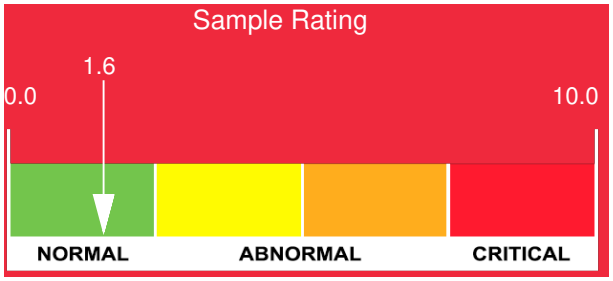


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
05/02/19	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0
02/01/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	3
08/25/18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0
08/25/18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1
05/23/18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
02/04/18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0
11/01/17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
10/13/17	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
08/10/17	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0
04/21/17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0
03/26/17	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
11/22/16	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
10/31/16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1
07/07/16	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0
04/22/16	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	22	0
04/13/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0
04/01/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
01/27/16	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0

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

Historical Comments

02/01/19	The current fluid has similar low viscosity, flash point and the distillation points as the previous sample due to the thermal cracking at high working temperature. The water and solid content are all very low. Please conduct the system venting in a regular base. Take one sample in 6 months to monitor the conditions.
08/25/18	This sample results are very similar to the Feb 4th 2018 sample. The current fluid has low viscosity, low flash point due to the severe thermal cracking at high bulk working temperature. Please conduct the effective system venting to release the low boiler. The acid number and solid content are all very low indicating minimum oxidation and minimum system deposit. Please take one sample in 4 months to monitor the conditions. (GCD) 10% Distillation Point is severely low. (GCD) 90% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 385°C is abnormally high. (GCD) 50% Distillation Point is abnormally low.
08/25/18	The current fluid conditions are improving. There are minimum third party contaminations such as water or dirty. The acid number and solid contents are very low, meaning minimum oxidation. The flash point is also higher than the last sample in May, but still considered low due to thermal cracking at ~290C bulk working temperature. Please continue to do the system venting as a routine maintenance schedule. Please take one sample in 6 months to monitor the conditions. COC Flash Point is low.
05/23/18	The currently fluid has experienced severe thermal cracking at the extremely high bulk working temperature. However, the fluid flash point and viscosity are all higher than the previous three used oil samples, so the overall fluid conditions are improving. Please continue to do the effective system venting and take one sample in 6 months to monitor the conditions. COC Flash Point is severely low. (GCD) 90% Distillation Point is marginally low.
02/04/18	The current fluid has normal distillation points, the acid number and solid contents are all very low. However, the flash point is still much lower than the fresh fluid due to the thermal cracking at the extremely high bulk working temperature. Please do a long and effective system venting and take one sample in 4 months to monitor the conditions. COC Flash Point is severely low.
11/01/17	The current fluid has very low acid number, normal distillation point, and minimum water and solid particles. However, the viscosity and flash point are still much lower than the fresh fluid due to the thermal cracking at 290C bulk temperature. The flash point is higher than the last sample on Oct 13th, so please continue to do the effective system venting, and take one sample in 4 months to verify the conditions. COC Flash Point is severely low.
10/13/17	The current fluid has adequate distillation points, viscosity, Tan or solids reading in general. However, the flash point is very low because of the presence of the low boiler/lighter oil. The fluid was partially thermal cracked by the high working temperature. Please do a longer system venting as soon as possible. The AIT test is recommended to double check the auto-ignition temperature. If the venting cannot be conducted efficiently, a partial oil change can be an option. Please take one sample in 3 months to monitor the conditions. COC Flash Point is severely low.

08/10/17

The current fluid contains increased low boiler/light oil due to the thermal cracking, therefore, the flash point and the viscosity are all reduced. Based on the GCD distillation results, the fluid is still suitable for use. However, we recommend a longer effective system venting as soon as possible. Please take one sample in 3 months to monitor the oil conditions.

04/21/17	

03/26/17	The current fluid has correct viscosity, TAN and distillation points. The solid level is acceptable. The flash point is still lower than the new fluid which is resulted from the thermal cracking at the high bulk temperature. Please continue to perform the system venting and take one sample in 4~6 months to monitor the conditions.

11/22/16	The fluid viscosity and flash point are all much lower than the fresh fluid. However, they are very similar to the samples taken on Nov 2016 and Oct 2016. The GCD, TAN, solid and water content are all normal. Please keep on doing the system venting as much as possible. Take one sample in 6 months to monitor the conditions.

10/31/16	The test results are very similar to the last sample on Oct 31 2016. The fluid has normal viscosity, GCD distillation points, TAN and the solid contents. However, the flash point starts to drop after half year operation. Most likely, a portion of the fluid has been thermally cracked at 290C bulk temperature, and the system venting is not enough. Please confirm if the system has been modified for the easy venting process? The venting frequency and duration need to be increased. Please take a sample in 4 months to monitor the conditions.

07/07/16	The fluid has normal viscosity, GCD distillation points, TAN and the solid contents. However, the flash point starts to drop after half year operation. Most likely, a portion of the fluid has been thermally cracked at 290C bulk temperature, and the system venting is not enough. Please confirm if the system has been modified for the easy venting process? The venting frequency and duration need to be increased. Please take a sample in 4 months to monitor the conditions.

04/22/16	The current oil has almost identical normal flash point, viscosity and distillation points as three months ago. The oil is in good condition and suitable for further use. Please take one sample in 6 months.

04/13/16	The fluid has adequate viscosity, distillation points, solid and TAN. COC Flash Point is a little lower than the fresh oil, but it is normal, assuming some old fluid mixing with the fresh fluid. Please keep working on the venting process on the regular base. Take one sample in 6 months to monitor the conditions.

04/01/16	COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low. Believe that this oil sample was taken before the oil change or just for the experimental study purpose. Again the old fluid need to be changed, and the venting process need to be improved.

01/27/16	Looks like the current fluid has been severely thermal cracked, so it is not suitable for the further use. Please conduct the effective system venting as soon as possible, otherwise, please do a partial oil change (i.e. 30%) or a complete oil change. COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.

01/12/16	COC Flash Point is severely low. All of the other fluid properties are OK at the moment. The low boiler/light oil is generated by the extremely high working temperature, which causes the low flash point. Please continue the automatic and manual system venting to bleed out the low boilers. If the venting process is not effective, please consider the 30% of the partial oil change.

09/06/15	COC Flash Point is severely low. All of the other fluid properties are normal. The low boiler/light oil is generated by the extremely high working temperature, which causes the low flash point. Please continue the automatic and manual system venting to bleed out the low boilers. Please take one sample in 6 months to monitor the conditions.

06/20/15	The viscosity, GCD distillation point, TAN and solid level are all normal. The low flash point is because of the thermal cracking with the high operation temperature. However, the flash point has improved a little. Please continue to do the current venting practice. Take a sample in 6 months to monitor the conditions. COC Flash Point is marginally low.

04/22/15	The supply line sample condition is better than the return line sample, especially for GCD% <335. All of the parameters are good enough, except the low flash point. Based on the previous normal AIT test result, we have learned we still could run the current fluid even though the flash point is abnormally low. Please continue to conduct the system venting process on a regular base and record the oil top up volume as well. Take one sample in 4 months to monitor the conditions. COC Flash Point is abnormally low.

02/15/15	The current sample analysis results are almost identical to the last two samples. All of the parameters are good enough, except the low flash point. Since we have done the AIT test not too long ago, and the AIT result was good. I just recommend continuing to run the fluid and conduct the current vening practice, and take one sample in 2 months to monitor the conditions.By the way, please provide me what system modification has been done by the installer during the turnaround? Thanks! COC Flash Point is abnormally low.

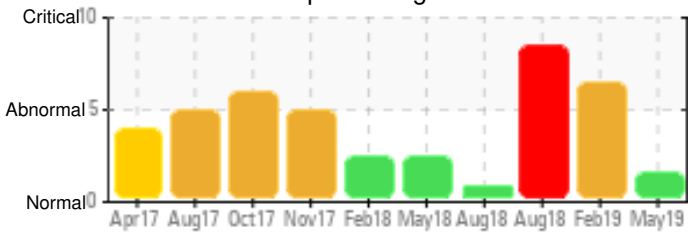
01/31/15	The current fluid has adequate viscosity, GCD distillation point, and TAN, however, the flash point is still low as the previous two samples. Please continue the venting process, and take one sample in 2 months.In the meanwhile, please help to get the heater heat flux (kW/m2 or Btu/hr. ft2) and the fluid flow rate (feet/second) from the end customer the system installer. COC Flash Point is abnormally low.

12/06/14	The current fluid has adequate viscosity, TAN and the distillation points. The water and solid contents are all normal. However, the flash point is still abnormally low. Please continue to do the same venting process as per discussed before. Please double check if there is any possibility for the frying cooking oil to leak into the heat transfer fluid system? Take one sample in 2 months to monitor the conditions. COC Flash Point is abnormally low. (GCD) 10% Distillation Point is marginally low.

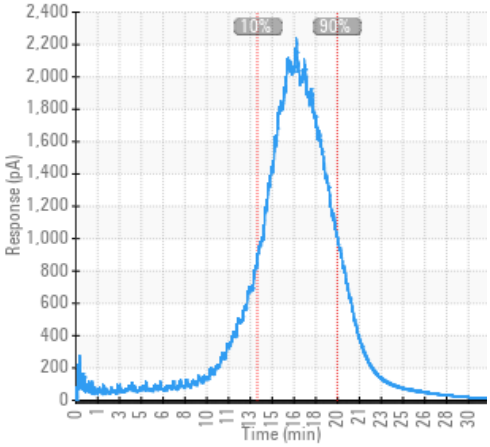
11/23/14	The tests show the current fluid has adequate reading on the GCD distillation, viscosity and TAN. However, the sample contains 0.2% (2000ppm) free water, which I don't believe it is true for the whole system. Most likely the sample is not a representative sample. Please make sure to drain/flush the sampling line longer (i.e. 6 liters) before taking the samples.COC Flash Point is marginally low.

10/19/14	The current fluid has normal viscosity, TAN and GCD distillation points. It is sui the left bottom corner, resulting in the low flash point. Please keep doing the ef one sample in two months to monitor the conditions. COC Flash Point is abnor

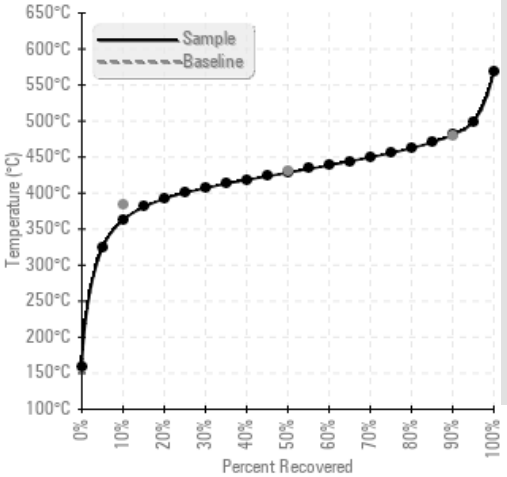
Sample Rating Trend



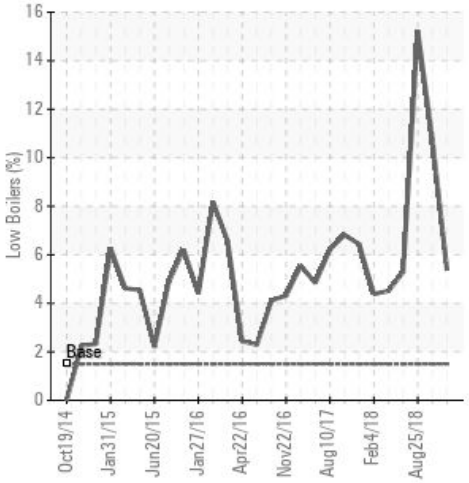
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Need to confirm if Cargill is still doing the same venting process (100~200L/month oil top up as the plan discussed 4 months ago)? There is no reason to see the low flash point and low viscosity grade if the same venting process is in place. We will re-test the flash point and viscosity if there is enough left over fluid. COC Flash Point is severely low. Viscosity is abnormally low.