

TABLE 3.12
Yield stress data of GTL 2 and crude oil blends

Test sample (mixture reference)	Brookfield Viscometer Model	Temperature (°F)	Yield Point Maximum torque (dyne-cm)	Yield stress (dyne/cm ²)
(a)	RV	27	-	-
(a)	RV	27	6202	171
(a)	RV	20	>7187	>199
(a)	RV	0	>7187	-
(a)	HB	0	>57496	>1589
(a)	HB	0	>57496	>1589
(a)	HB	-20	>57496	>1589
(a)	HB	-20	>57496	>1589
(b)	RV	20	108	2.98
(b)	RV	20	93.4	2.58
(b)	RV	20	115	3.18
(b)	LV	0	>674	-
(b)	HB	0	23746	656
(b)	HB	0	26506	732
(b)	HB	-20	>57496	>1589
(b)	HB	-20	>57496	>1589
(c)	RV	20	28.7	0.79
(c)	RV	20	64.7	1.79
(c)	RV	20	28.7	0.79
(c)	LV	0	>674	-
(c)	RV	0	>7187	-
(c)	HB	0	12592	348
(c)	HB	0	15581	431
(c)	HB	-20	>57496	>1589



FIGURE 3.1 The Anton-Paar Digital Density Meter.

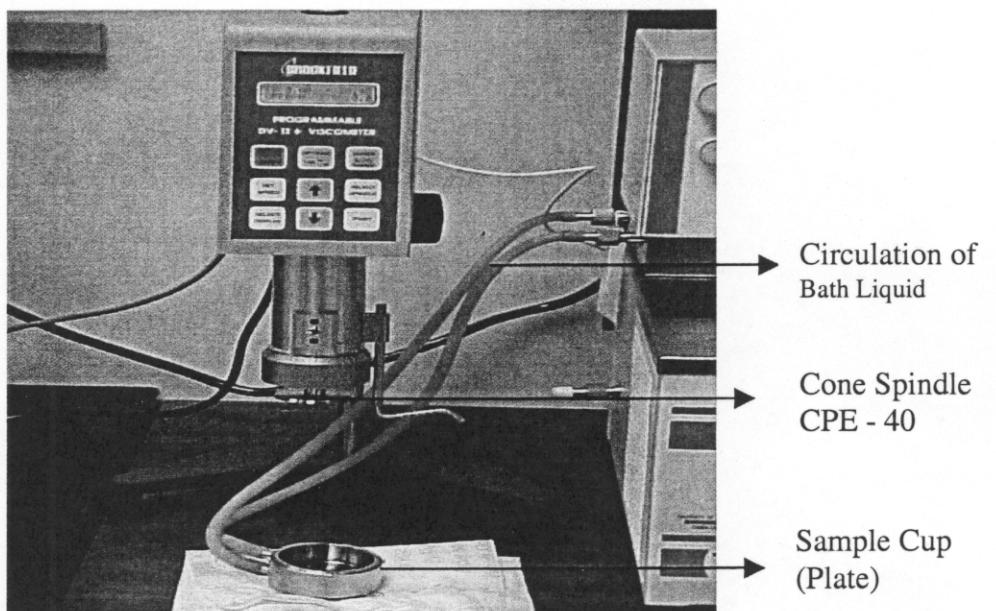


FIGURE 3.2 The Brookfield Cone and Plate Viscometer.

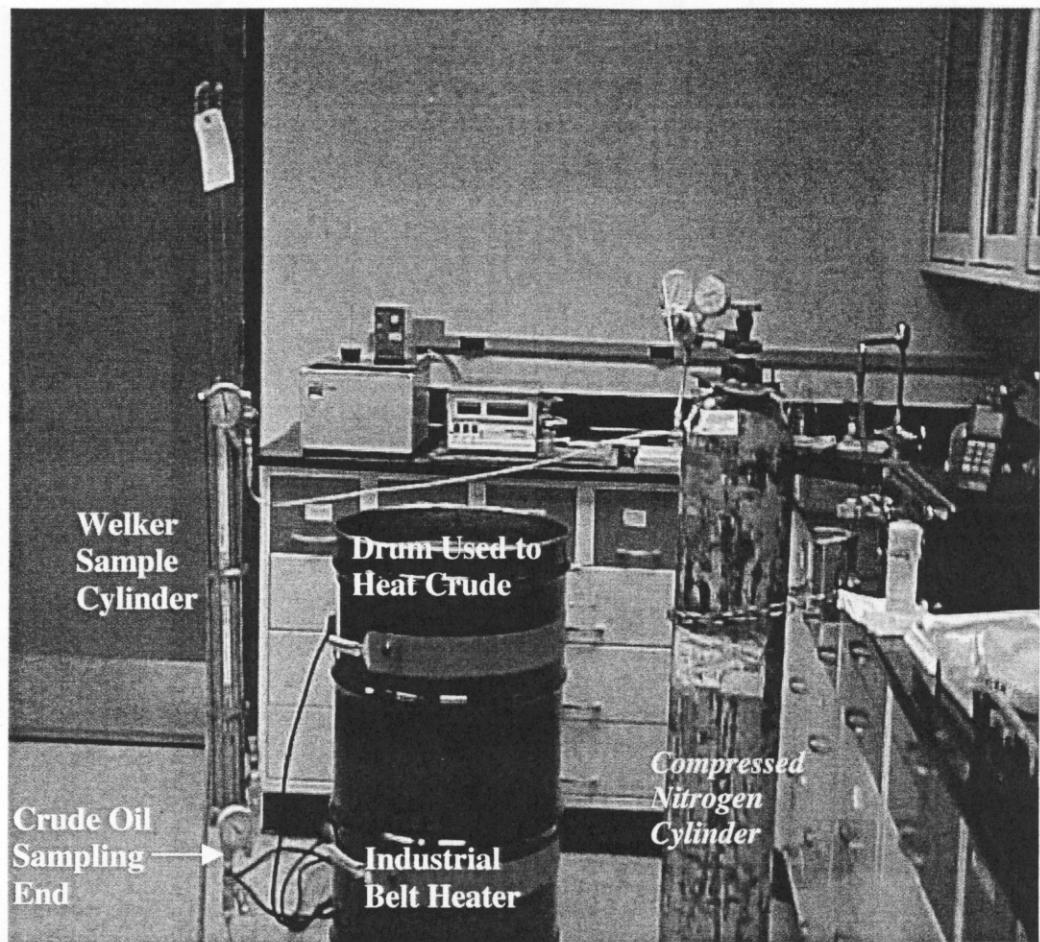
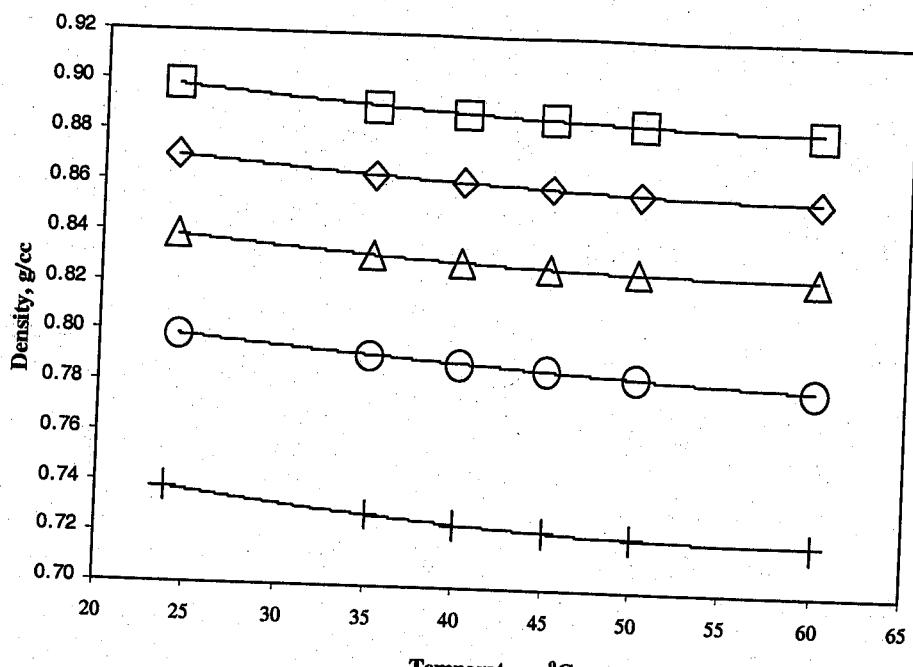


FIGURE 3.3 Crude oil re-conditioning assembly.



□ 100% Crude Oil ◇ Crude:GTL (3:1) △ Crude:GTL (1:1) ○ Crude:GTL (1:3) + 100% GTL

FIGURE 3.4 Experimental density data of tested crude oil, GTL, and their blends.

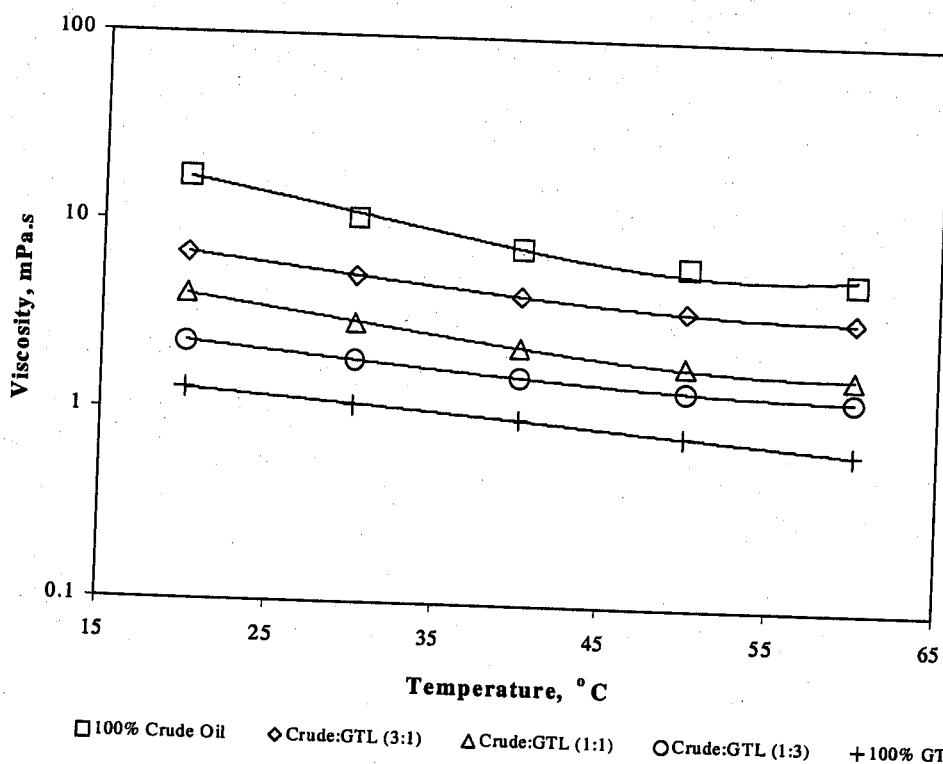


FIGURE 3.5 Experimental viscosity data of tested crude oil, GTL, and their blends.

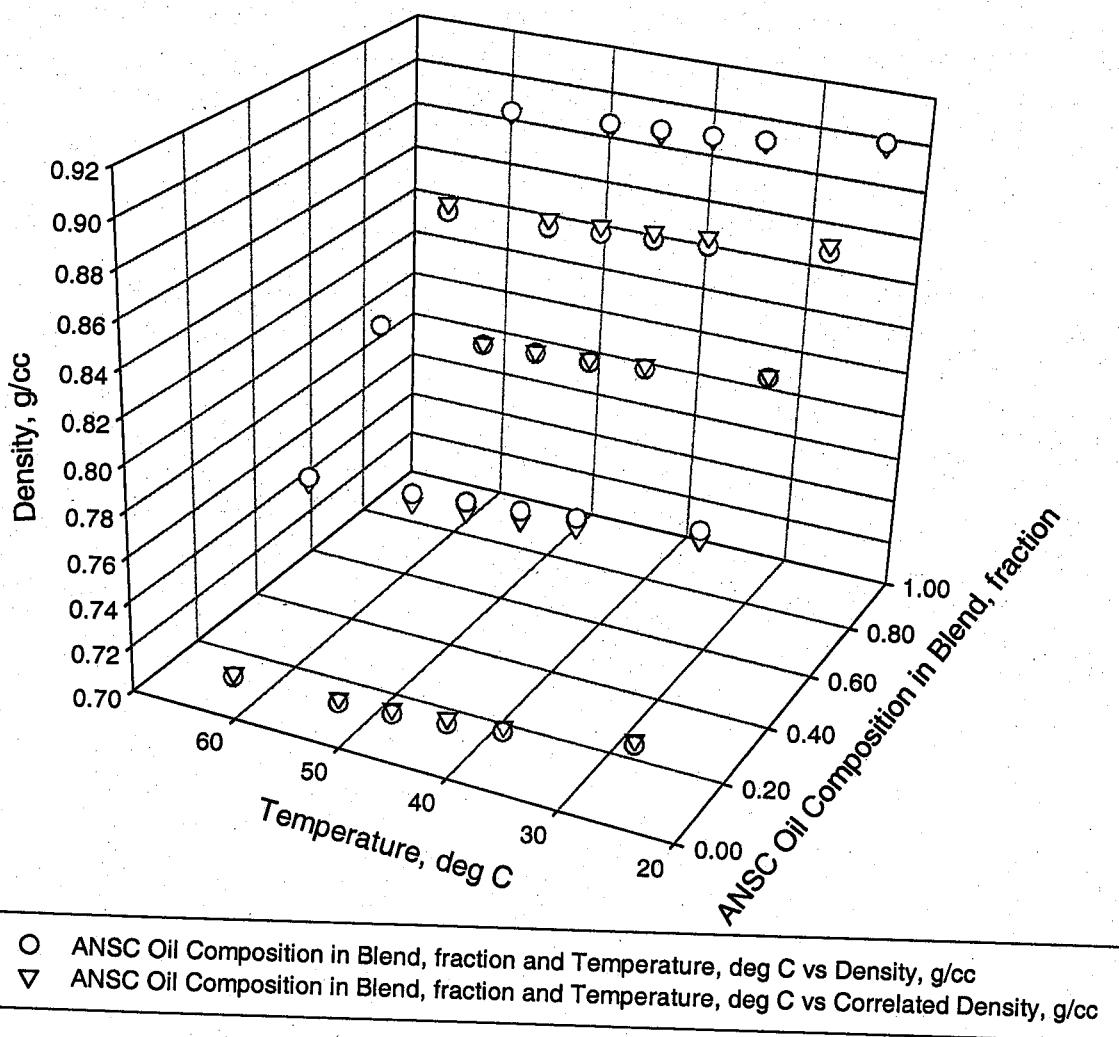


FIGURE 3.6 Comparison of correlated and measured density data for the tested crude oil (ANSC), GTL, and their blends as a function of temperature and ANSC oil composition (fraction) in the blend.

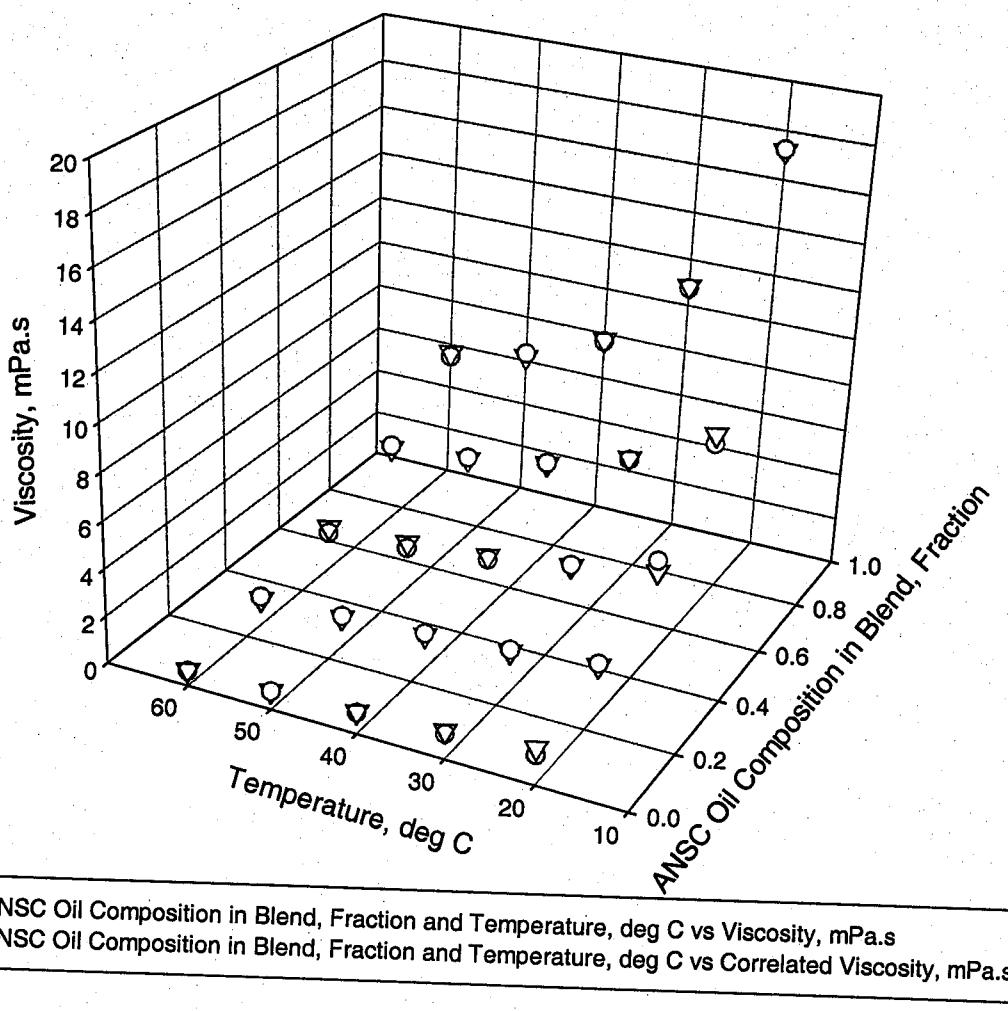


FIGURE 3.7 Comparison of correlated and measured viscosity data for the tested crude oil (ANSC), GTL, and their blends as a function of temperature and ANSC oil composition (fraction) in the blend.

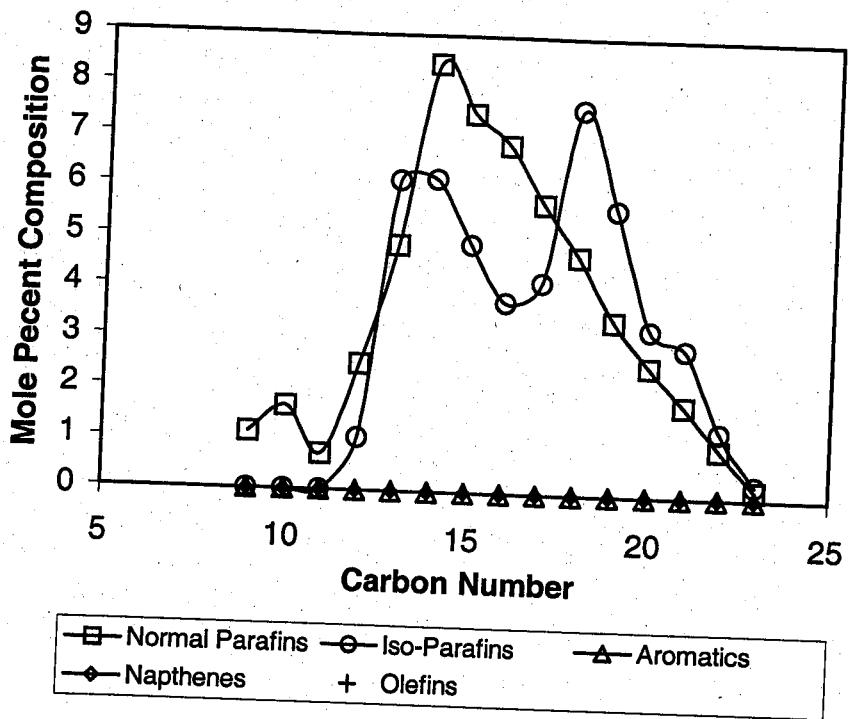


FIGURE 3.8 PIANO analysis of GTL 2 sample.

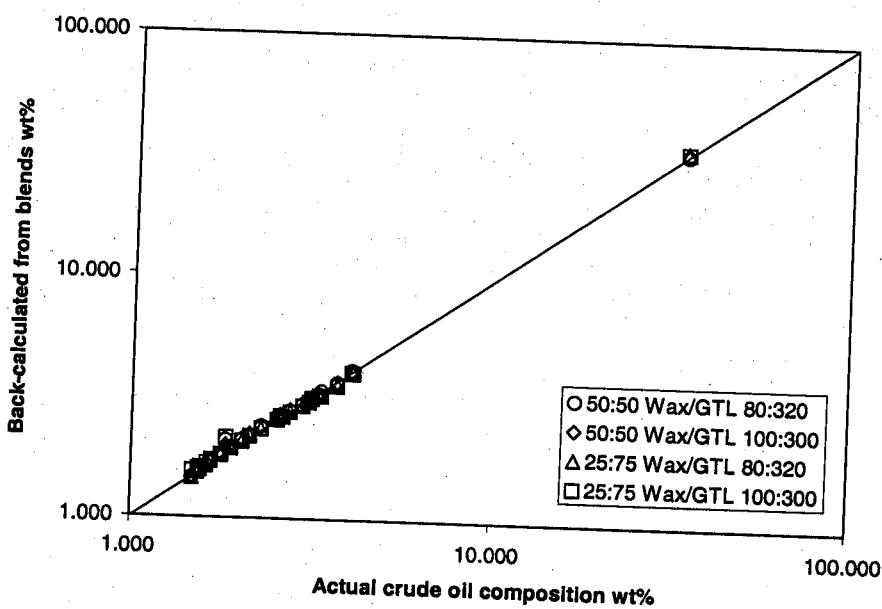


FIGURE 3.9 Comparison of back-calculated and actual TAPS crude oil composition (components having composition less than 1 wt % are not shown).

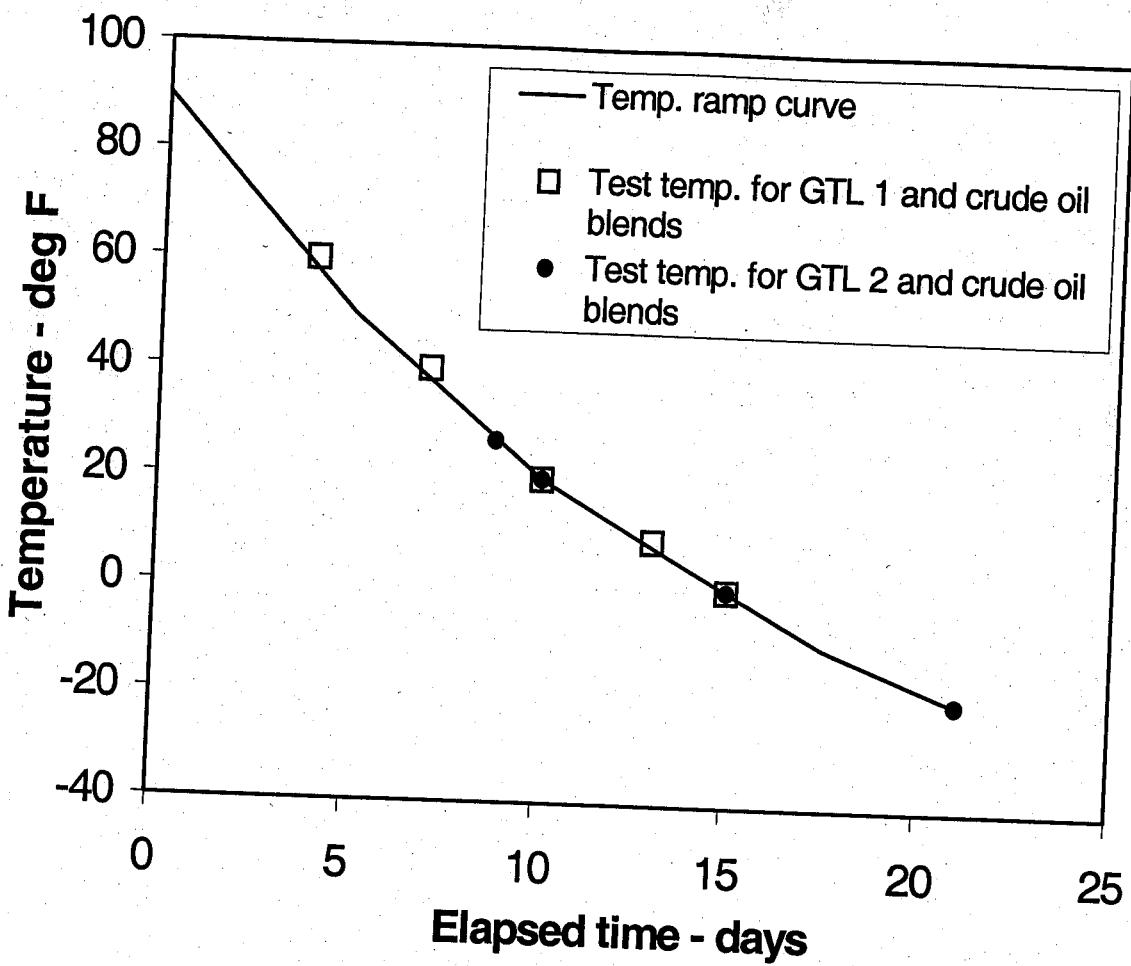
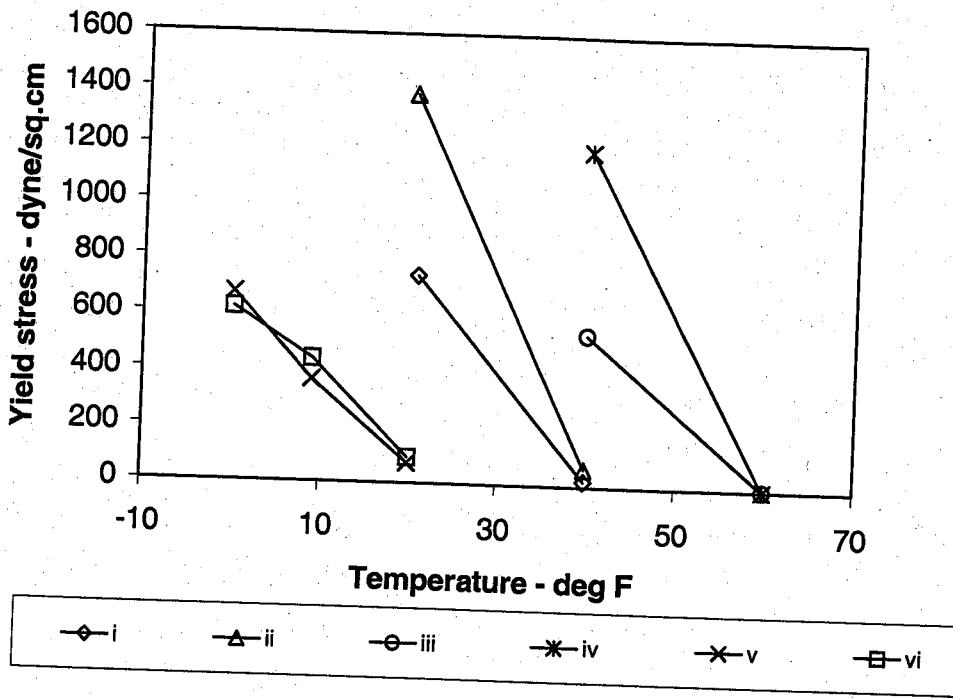
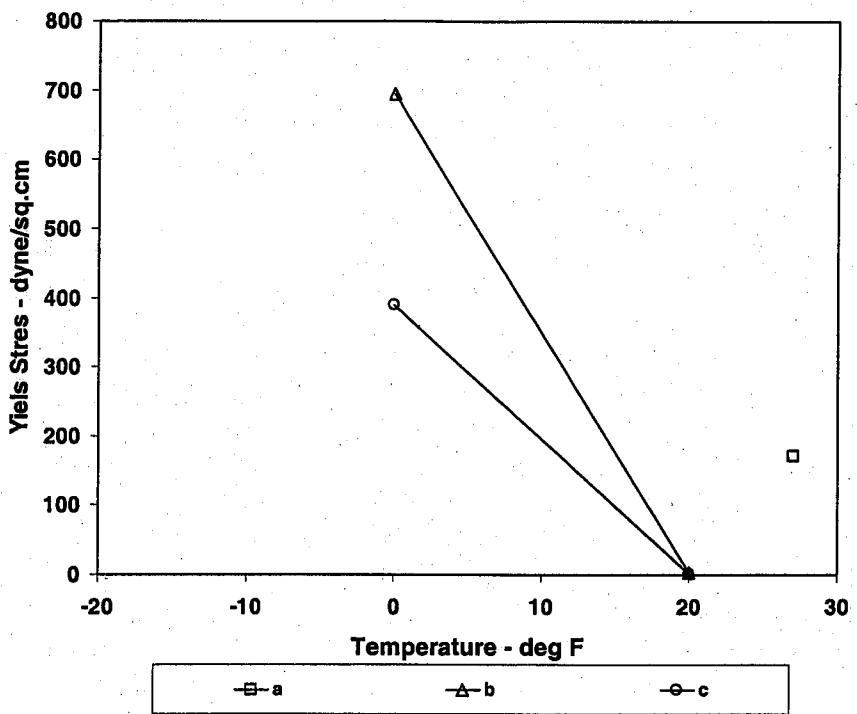


FIGURE 3.10 Cooling ramp and profile of test temperatures for gel strength measurements.



Sample Number	Composition of samples by %		
	ANS Crude	GTL1 Liquid	GTL1 Lt wax
1	80%	15%	5%
2	75%	18.75%	6.25%
3	80%	10%	10%
4	75%	12.5%	12.5%
5	80%	20%	
6	75%	25%	

FIGURE 3.11 Yield Stress data of GTL 1 and TAPS crude oil blends as a function of test temperature



Compositions by %

Sample	GTL	ANS Crude
a	100%	0%
b	25%	75%
c	20%	80%

FIGURE 3.12 Yield stress data of GTL 2 and TAPS crude oil blends as a function of test temperature

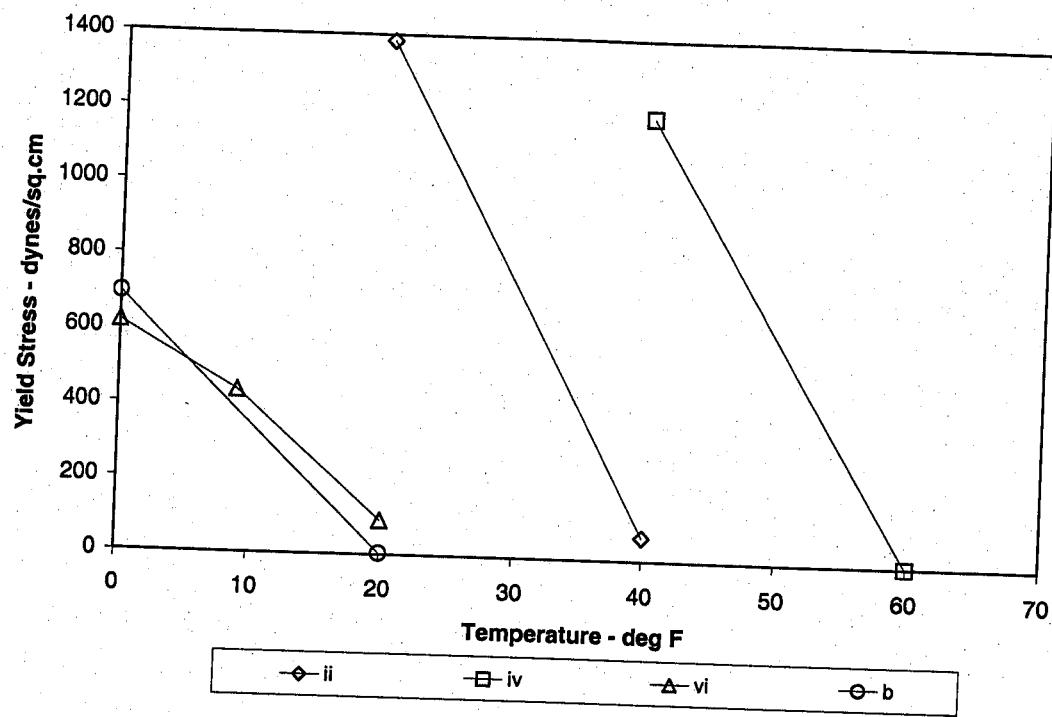


FIGURE 3.13 Comparison of gel strength measurements of GTL 1 and GTL 2 TAPS crude oil blends for the ratio of 1:3 GTL1/2:Crude oil.

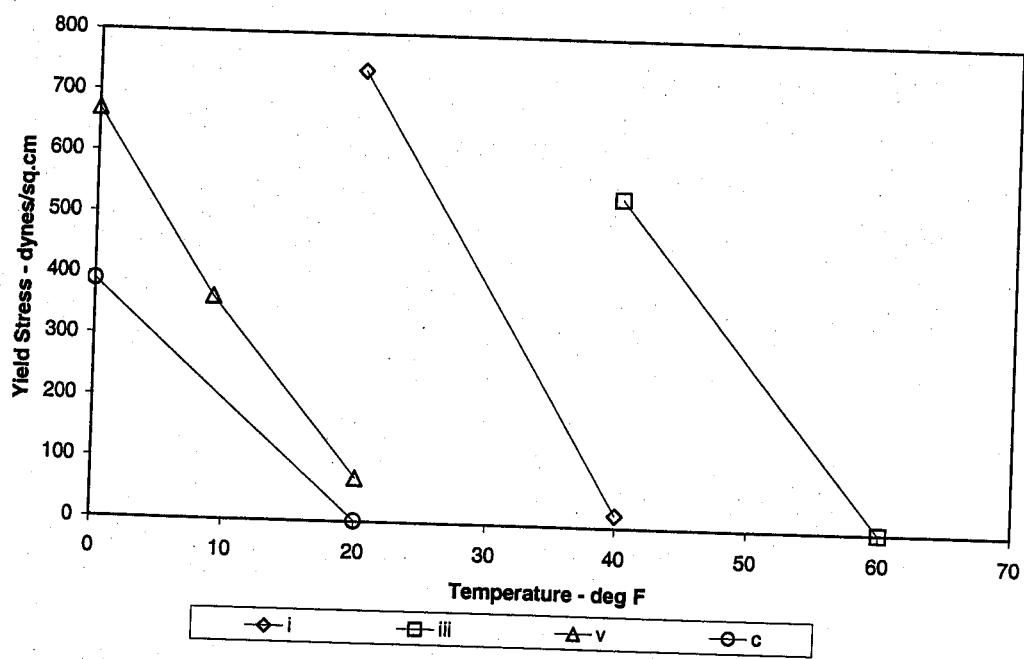


FIGURE 3.14 Comparison of gel strength measurements of GTL 1 and GTL 2 TAPS crude oil blends for the ratio of 1:4 GTL1/2:Crude oil.