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APPENDICES

APPENDIX A: Raw Data

The data were collected by Reactor controller model 4848 from Parr Instrument. Pressure is collected in the unit of pound per square inches (psi) and temperature is collect in the unit of degree of Celsius. Pressure and temperature are read every minute. Raw data in this research include

- A.1 Crude oil at 30 degree of Celsius (Experiment 1)
- A.2 Crude oil at 30 degree of Celsius (Experiment 2)
- A.3 Crude oil at 30 degree of Celsius (Experiment 3)
- A.4 n-pentane at 30 degree of Celsius (Experiment 1)
- A.5 n-pentane at 30 degree of Celsius (Experiment 2)
- A.6 n-heptane at 30 degree of Celsius (Experiment 1)
- A.7 n-heptane at 30 degree of Celsius (Experiment 2)
- A.8 n-heptane at 40 degree of Celsius (Experiment 1)
- A.9 Crude oil at 40 degree of Celsius (Experiment 1)
- A.10 n-decane at 20 degree of Celsius (Experiment 1)
- A.11 Table summary of raw data
- A.12 Data of crude oil

A.1 Crude oil at 30 degree of Celsius (Experiment 1).

A.1.1 Initial pressure: 500 psi Injection time: 17.2 sec

Time	P	T	40	372	30.9	81	354	29.9	122	352	30.6	163	350	29.6	204	346	30.5
0	500	30.7	41	371	30.8	82	354	29.9	123	352	30.7	164	350	29.6	205	346	30.4
1	466	31.8	42	370	30.8	83	354	29.9	124	352	30.7	165	350	29.7	206	346	30.4
2	457	31.8	43	369	30.8	84	354	29.9	125	352	30.7	166	350	29.7	207	346	30.4
3	450	31.5	44	367	30.7	85	354	30	126	352	30.7	167	350	29.7	208	346	30.4
4	443	31.2	45	366	30.6	86	353	30	127	352	30.7	168	350	29.7	209	346	30.3
5	438	31	46	365	30.6	87	353	30	128	352	30.8	169	350	29.7	210	346	30.3
6	433	30.8	47	365	30.4	88	353	30	129	352	30.8	170	350	29.8	211	346	30.3
7	428	30.7	48	364	30.4	89	353	30	130	352	30.8	171	350	29.8	212	346	30.3
8	424	30.6	49	363	30.3	90	353	30	131	351	30.7	172	350	29.8	213	346	30.3
9	420	30.5	50	363	30.2	91	353	30.1	132	351	30.7	173	350	29.8	214	346	30.2
10	416	30.5	51	362	30.2	92	353	30.1	133	351	30.6	174	349	30	215	346	30.2
11	413	30.4	52	362	30.2	93	353	30.1	134	350	30.5	175	349	30	216	346	30.2
12	410	30.4	53	361	30.1	94	353	30.1	135	350	30.4	176	349	30	217	346	30.2
13	407	30.4	54	360	30.1	95	353	30.1	136	350	30.3	177	349	30	218	346	30.3
14	405	30.4	55	360	30.1	96	353	30.1	137	349	30.2	178	349	30.1	219	345	30.3
15	403	30.4	56	360	30.1	97	353	30.1	138	349	30.1	179	349	30.1	220	345	30.3
16	400	30.4	57	359	30	98	353	30.1	139	349	30.1	180	349	30.1	221	345	30.3
17	398	30.4	58	359	30	99	353	30.1	140	349	30	181	348	30.1	222	345	30.3
18	396	30.4	59	358	30	100	353	30.2	141	349	29.8	182	348	30.1	223	345	30.3
19	395	30.4	60	358	30	101	353	30.2	142	348	29.7	183	348	30.1	224	345	30.3
20	393	30.4	61	358	30	102	352	30.2	143	348	29.7	184	348	30.1	225	345	30.3
21	391	30.4	62	358	29.9	103	352	30.2	144	348	29.6	185	348	30.1	226	345	30.3
22	390	30.4	63	357	29.9	104	352	30.3	145	348	29.6	186	348	30.1	227	345	30.1
23	388	30.5	64	357	29.9	105	353	30.3	146	348	29.5	187	348	30.2	228	345	30.1
24	387	30.5	65	357	29.8	106	352	30.3	147	348	29.5	188	348	30.2	229	345	30.1
25	386	30.5	66	357	29.9	107	352	30.3	148	348	29.4	189	348	30.2	230	345	30.1
26	384	30.5	67	356	29.9	108	352	30.3	149	348	29.4	190	348	30.2	231	345	30.1
27	383	30.6	68	356	29.9	109	352	30.4	150	348	29.4	191	348	30.3	232	345	30.1
28	382	30.6	69	356	29.9	110	352	30.4	151	349	29.4	192	347	30.3	233	345	30.1
29	381	30.6	70	356	29.8	111	352	30.4	152	349	29.3	193	347	30.3	234	345	30.1
30	380	30.6	71	356	29.8	112	352	30.4	153	349	29.4	194	347	30.3	235	345	30.1
31	378	30.6	72	355	29.8	113	352	30.5	154	349	29.4	195	347	30.3	236	345	30.2
32	378	30.6	73	355	29.8	114	352	30.5	155	349	29.4	196	347	30.4	237	345	30.2
33	377	30.7	74	355	29.8	115	352	30.5	156	349	29.4	197	347	30.4	238	344	30.2
34	376	30.7	75	355	29.8	116	352	30.5	157	349	29.4	198	347	30.4	239	344	30.2
35	375	30.7	76	355	29.8	117	352	30.5	158	350	29.4	199	347	30.4	240	344	30.2
36	374	30.7	77	355	29.8	118	352	30.6	159	350	29.5	200	347	30.5			
37	374	30.7	78	354	29.8	119	352	30.6	160	350	29.6	201	347	30.5			
38	373	30.7	79	354	29.9	120	352	30.6	161	350	29.5	202	347	30.5			
39	372	30.8	80	354	29.9	121	352	30.6	162	350	29.6	203	347	30.5			

A.1.2 Initial pressure: 600 psi Injection time: 19.1 sec

Time	P	T	42	436	30.7	85	417	30.3	128	417	31	171	413	29.8	214	412	30.2
0	600	30.8	43	436	30.6	86	417	30.3	129	418	31	172	413	29.8	215	412	30.2
1	556	32.2	44	435	30.6	87	417	30.3	130	418	31	173	413	29.8	216	412	30.2
2	536	32.2	45	435	30.6	88	417	30.3	131	418	31	174	413	29.8	217	412	30.2
3	527	31.9	46	434	30.6	89	417	30.3	132	418	31	175	413	29.8	218	412	30.1
4	519	31.6	47	434	30.6	90	417	30.3	133	418	31.1	176	413	29.8	219	412	30.1
5	512	31.4	48	433	30.6	91	417	30.3	134	418	31.1	177	413	29.8	220	412	30.1
6	506	31.1	49	433	30.6	92	417	30.3	135	418	31.1	178	413	29.8	221	412	30.1
7	500	31	50	433	30.6	93	417	30.3	136	418	31.1	179	413	29.8	222	412	30.2
8	495	31	51	432	30.6	94	417	30.3	137	418	31.2	180	413	29.9	223	412	30.3
9	491	30.9	52	432	30.6	95	417	30.3	138	418	31.2	181	413	29.9	224	412	30.3
10	486	30.7	53	431	30.6	96	417	30.4	139	417	31.2	182	413	29.9	225	412	30.3
11	482	30.8	54	431	30.6	97	417	30.4	140	417	31.2	183	413	29.9	226	412	30.2
12	479	30.6	55	431	30.6	98	417	30.4	141	416	31.1	184	413	29.9	227	412	30.2
13	476	30.7	56	431	30.6	99	417	30.4	142	416	31	185	413	29.9	228	412	30.2
14	472	30.7	57	430	30.6	100	417	30.4	143	415	30.8	186	413	29.9	229	412	30.3
15	470	30.7	58	430	30.6	101	417	30.4	144	415	30.7	187	413	29.9	230	412	30.3
16	467	30.7	59	429	30.6	102	417	30.4	145	415	30.6	188	413	29.9	231	412	30.3
17	465	30.7	60	427	30.6	103	417	30.5	146	414	30.6	189	413	30	232	412	30.3
18	463	30.6	61	426	30.6	104	417	30.5	147	414	30.5	190	413	30	233	412	30.4
19	461	30.6	62	425	30.5	105	417	30.5	148	414	30.4	191	413	30	234	412	30.4
20	459	30.6	63	424	30.5	106	417	30.5	149	414	30.2	192	413	30	235	411	30.3
21	457	30.6	64	423	30.5	107	417	30.5	150	414	30.2	193	413	30	236	411	30.3
22	456	30.6	65	423	30.4	108	417	30.5	151	414	30.2	194	413	30	237	411	30.3
23	454	30.6	66	422	30.4	109	417	30.5	152	413	30.1	195	413	30	238	411	30.3
24	453	30.6	67	422	30.4	110	417	30.5	153	413	30.1	196	413	30	239	411	30.2
25	451	30.6	68	421	30.5	111	417	30.5	154	413	30	197	413	30	240	411	30.2
26	450	30.6	69	421	30.4	112	417	30.5	155	413	30	198	413	30			
27	449	30.6	70	420	30.3	113	417	30.5	156	413	29.9	199	413	30			
28	448	30.6	71	420	30.3	114	417	30.6	157	413	29.9	200	413	30			
29	446	30.6	72	420	30.4	115	417	30.6	158	413	29.9	201	412	30.2			
30	445	30.6	73	419	30.3	116	417	30.6	159	413	29.9	202	412	30.2			
31	444	30.6	74	419	30.3	117	417	30.6	160	413	29.9	203	412	30.1			
32	444	30.6	75	419	30.2	118	417	30.7	161	413	29.9	204	412	30.1			
33	443	30.6	76	419	30.3	119	417	30.7	162	413	29.9	205	412	30.1			
34	442	30.6	77	418	30.2	120	417	30.7	163	413	29.9	206	412	30.1			
35	441	30.6	78	418	30.3	121	417	30.7	164	413	29.9	207	412	30.1			
36	440	30.6	79	418	30.3	122	417	30.8	165	413	29.9	208	412	30.1			
37	439	30.6	80	418	30.2	123	417	30.8	166	413	29.9	209	412	30.1			
38	439	30.6	81	418	30.2	124	417	30.8	167	413	29.9	210	412	30.2			
39	438	30.6	82	418	30.3	125	417	30.9	168	413	29.9	211	412	30.2			
40	438	30.6	83	417	30.3	126	417	30.9	169	413	29.9	212	412	30.2			

A.1.3 Initial pressure: 700 psi Injection time: 15.6 sec

Time	P	T	41	483	30.4	83	473	30.3	125	470	30.1	167	468	30	209	468	30
0	700	31.6	42	483	30.4	84	473	30.3	126	470	30.1	168	468	30	210	468	30
1	651	32.7	43	482	30.5	85	473	30.3	127	470	30.1	169	468	30	211	468	30
2	625	32.7	44	482	30.4	86	473	30.3	128	470	30.1	170	468	30	212	468	30
3	609	32.3	45	481	30.4	87	473	30.2	129	470	30.1	171	468	30	213	468	30
4	595	32.1	46	481	30.4	88	472	30.2	130	470	30.1	172	468	30	214	468	30
5	583	31.9	47	480	30.4	89	472	30.2	131	470	30	173	468	30	215	468	30
6	573	31.8	48	480	30.4	90	472	30.1	132	469	30	174	468	30	216	468	30.1
7	563	31.7	49	480	30.4	91	472	30.2	133	469	30.1	175	468	30	217	468	30.1
8	553	31.6	50	479	30.4	92	472	30.2	134	469	30.1	176	468	30	218	468	30.1
9	545	31.5	51	479	30.5	93	472	30.3	135	469	30.1	177	468	30	219	468	30.1
10	538	31.4	52	479	30.4	94	472	30.3	136	469	30.1	178	468	30	220	468	30.1
11	531	31.2	53	479	30.3	95	472	30.2	137	469	30.1	179	468	30	221	468	30
12	526	31.1	54	478	30.4	96	472	30.2	138	469	30.1	180	468	30	222	468	30
13	521	31.1	55	478	30.4	97	472	30.3	139	469	30.1	181	468	30	223	468	30
14	518	31	56	478	30.4	98	472	30.2	140	469	30	182	468	30	224	468	30
15	513	30.9	57	477	30.4	99	472	30.2	141	469	30	183	468	29.9	225	468	30
16	510	30.9	58	477	30.4	100	471	30.2	142	469	30	184	468	29.9	226	468	30
17	506	30.8	59	477	30.4	101	471	30.2	143	469	30	185	468	29.9	227	468	30
18	504	30.7	60	477	30.4	102	471	30.2	144	469	30	186	468	30	228	468	30
19	503	30.7	61	476	30.4	103	471	30.2	145	469	30	187	468	30	229	468	30
20	501	30.6	62	476	30.4	104	471	30.2	146	469	30	188	468	30	230	468	30.1
21	500	30.6	63	476	30.4	105	471	30.2	147	469	30	189	468	30	231	468	30.1
22	499	30.5	64	476	30.4	106	471	30.1	148	469	30	190	468	29.9	232	468	30.1
23	497	30.5	65	476	30.4	107	471	30.2	149	469	30	191	468	29.9	233	468	30.1
24	496	30.5	66	475	30.3	108	471	30.2	150	469	30	192	468	29.9	234	468	30.1
25	495	30.5	67	475	30.4	109	471	30.2	151	469	30	193	468	30	235	468	30.1
26	494	30.4	68	475	30.3	110	471	30.2	152	469	30	194	468	30	236	468	30.1
27	493	30.4	69	475	30.3	111	471	30.1	153	469	30	195	468	30	237	468	30.1
28	492	30.4	70	475	30.3	112	471	30.1	154	469	30	196	468	30	238	468	30.2
29	491	30.4	71	474	30.3	113	471	30.1	155	469	30	197	468	29.9	239	468	30.2
30	490	30.4	72	474	30.3	114	470	30.1	156	469	30	198	468	29.9	240	468	30.2
31	490	30.4	73	474	30.3	115	470	30.1	157	469	30	199	468	30			
32	488	30.4	74	474	30.3	116	470	30.1	158	468	30	200	468	30			
33	488	30.4	75	474	30.3	117	470	30.1	159	468	30	201	468	30			
34	487	30.4	76	474	30.3	118	470	30.1	160	468	29.9	202	468	30			
35	487	30.4	77	474	30.3	119	470	30.1	161	469	30	203	468	29.9			
36	486	30.4	78	474	30.3	120	470	30.1	162	468	30	204	468	30			
37	485	30.5	79	473	30.3	121	470	30.1	163	468	30	205	468	30			
38	485	30.5	80	473	30.3	122	470	30.1	164	468	30	206	468	30			
39	484	30.4	81	473	30.2	123	470	30.1	165	468	30	207	468	30			
40	483	30.4	82	473	30.3	124	470	30.1	166	468	30	208	468	30			

A.1.4 Initial pressure: 800 psi Injection time: 19.3 sec

Time	P	T	41	565	30.3	83	549	30.5	125	551	30.2	167	552	30.2	209	550	29.9
0	800	31.2	42	564	30.4	84	549	30.5	126	551	30.2	168	552	30.2	210	550	29.9
1	737	32.4	43	564	30.4	85	549	30.4	127	551	30.2	169	552	30.2	211	550	29.9
2	709	32	44	563	30.4	86	549	30.4	128	551	30.2	170	552	30.2	212	550	29.9
3	689	31.4	45	563	30.5	87	549	30.4	129	551	30.2	171	551	30.1	213	550	29.9
4	673	31	46	563	30.5	88	548	30.4	130	551	30.2	172	552	30.1	214	550	29.9
5	659	30.7	47	562	30.5	89	548	30.4	131	551	30.2	173	551	30.2	215	550	29.9
6	647	30.4	48	562	30.6	90	548	30.4	132	551	30.2	174	551	30.2	216	550	29.9
7	636	30.3	49	562	30.5	91	548	30.4	133	551	30.3	175	551	30.2	217	550	29.9
8	626	30.2	50	562	30.5	92	548	30.3	134	551	30.3	176	551	30.2	218	550	29.9
9	618	30.1	51	562	30.6	93	548	30.3	135	551	30.2	177	551	30.2	219	550	29.9
10	611	30	52	561	30.6	94	548	30.3	136	551	30.3	178	551	30.2	220	550	29.9
11	605	30	53	561	30.6	95	548	30.3	137	551	30.3	179	551	30.1	221	550	29.9
12	601	29.9	54	561	30.6	96	548	30.1	138	552	30.2	180	551	30.1	222	550	29.8
13	598	29.9	55	561	30.6	97	548	30.1	139	552	30.2	181	551	30.1	223	550	29.8
14	595	29.9	56	561	30.7	98	548	30.1	140	552	30.2	182	551	30.1	224	550	29.8
15	592	29.9	57	561	30.7	99	548	30	141	552	30.3	183	551	30.1	225	550	29.8
16	590	29.8	58	560	30.7	100	548	30	142	552	30.3	184	551	30.1	226	550	29.8
17	587	29.8	59	560	30.7	101	548	30	143	552	30.2	185	551	30.1	227	550	29.8
18	585	29.8	60	560	30.7	102	548	29.9	144	552	30.3	186	551	30.1	228	550	29.8
19	583	29.8	61	560	30.8	103	548	29.9	145	552	30.3	187	551	30.1	229	550	29.8
20	582	29.8	62	560	30.8	104	548	29.9	146	552	30.2	188	551	30.1	230	550	29.8
21	580	29.8	63	560	30.8	105	549	29.9	147	552	30.2	189	551	30.1	231	550	29.8
22	579	29.8	64	559	30.8	106	549	29.9	148	552	30.2	190	551	30.1	232	550	29.8
23	578	29.8	65	558	30.9	107	549	29.9	149	552	30.3	191	551	30.1	233	550	29.8
24	576	29.8	66	558	30.8	108	549	29.9	150	552	30.3	192	551	30.1	234	550	29.8
25	575	29.9	67	557	30.8	109	549	29.9	151	552	30.2	193	551	30.1	235	551	29.8
26	574	29.9	68	556	30.8	110	549	30	152	552	30.2	194	551	30.1	236	551	29.9
27	573	29.9	69	555	30.8	111	550	30	153	552	30.3	195	551	30	237	551	29.9
28	573	30	70	555	30.8	112	550	30	154	552	30.3	196	551	30	238	551	29.9
29	571	30	71	554	30.8	113	550	30	155	552	30.3	197	551	30	239	552	30
30	571	30	72	554	30.8	114	550	30	156	552	30.2	198	551	30	240	552	30
31	570	30	73	553	30.7	115	550	30	157	552	30.2	199	551	30			
32	569	30.1	74	552	30.7	116	550	30	158	552	30.2	200	551	30			
33	569	30.2	75	552	30.7	117	550	30	159	552	30.3	201	551	30			
34	568	30.2	76	551	30.7	118	550	30.1	160	552	30.2	202	551	30			
35	567	30.2	77	551	30.6	119	550	30.1	161	552	30.2	203	551	30			
36	567	30.2	78	551	30.6	120	551	30.1	162	552	30.2	204	551	30			
37	567	30.3	79	550	30.6	121	551	30.2	163	552	30.2	205	550	30			
38	566	30.3	80	550	30.6	122	551	30.2	164	552	30.2	206	551	29.9			
39	565	30.3	81	550	30.5	123	551	30.2	165	552	30.2	207	550	29.9			
40	565	30.3	82	550	30.6	124	551	30.2	166	552	30.2	208	550	29.9			

A.1.5 Initial pressure: 850 psi Injection time: 24.5 sec

Time	P	T	41	605	30.3	83	595	30.8	125	590	30.6	167	592	31.1	209	588	30.3
0	850	31.7	42	605	30.4	84	594	30.7	126	591	30.6	168	592	31.1	210	588	30.2
1	792	32.6	43	605	30.4	85	593	30.7	127	591	30.6	169	593	31.1	211	588	30.3
2	756	32.3	44	604	30.4	86	593	30.6	128	591	30.6	170	593	31.1	212	588	30.2
3	734	31.6	45	604	30.4	87	592	30.5	129	591	30.7	171	593	31.2	213	588	30.2
4	715	31.2	46	604	30.4	88	592	30.5	130	591	30.7	172	593	31.2	214	588	30.2
5	700	30.9	47	604	30.4	89	591	30.5	131	590	30.7	173	593	31.2	215	588	30.2
6	688	30.7	48	603	30.4	90	591	30.4	132	590	30.7	174	593	31.2	216	588	30.2
7	678	30.6	49	603	30.4	91	591	30.3	133	590	30.7	175	592	31.2	217	588	30.2
8	670	30.5	50	603	30.4	92	590	30.3	134	590	30.7	176	591	31.1	218	588	30.3
9	663	30.4	51	603	30.4	93	590	30.3	135	590	30.6	177	591	31	219	588	30.3
10	658	30.4	52	603	30.4	94	590	30.3	136	590	30.6	178	590	30.9	220	588	30.3
11	652	30.3	53	602	30.4	95	590	30.3	137	590	30.6	179	590	30.8	221	588	30.3
12	648	30.3	54	602	30.4	96	590	30.3	138	590	30.6	180	590	30.8	222	588	30.3
13	644	30.2	55	602	30.4	97	590	30.3	139	590	30.6	181	590	30.7	223	588	30.3
14	640	30.2	56	602	30.5	98	590	30.3	140	590	30.6	182	590	30.7	224	588	30.3
15	637	30.1	57	602	30.5	99	590	30.3	141	590	30.6	183	589	30.6	225	588	30.3
16	634	30.1	58	602	30.5	100	589	30.3	142	590	30.6	184	589	30.6	226	589	30.4
17	631	30.1	59	602	30.5	101	589	30.3	143	590	30.6	185	589	30.5	227	589	30.4
18	629	30.1	60	601	30.5	102	589	30.3	144	590	30.6	186	589	30.5	228	589	30.4
19	626	30.1	61	601	30.5	103	589	30.3	145	590	30.6	187	589	30.5	229	589	30.4
20	624	30.1	62	601	30.6	104	589	30.3	146	590	30.6	188	589	30.5	230	589	30.4
21	623	30.1	63	601	30.6	105	589	30.3	147	590	30.6	189	589	30.5	231	588	30.4
22	621	30.1	64	601	30.6	106	589	30.3	148	590	30.7	190	589	30.5	232	588	30.4
23	619	30.1	65	601	30.6	107	589	30.3	149	590	30.6	191	589	30.5	233	588	30.4
24	618	30.1	66	601	30.6	108	589	30.3	150	591	30.7	192	589	30.5	234	588	30.4
25	617	30.2	67	601	30.6	109	589	30.4	151	591	30.7	193	589	30.5	235	588	30.3
26	615	30.1	68	601	30.6	110	589	30.4	152	591	30.7	194	589	30.5	236	588	30.3
27	614	30.1	69	601	30.6	111	589	30.4	153	591	30.7	195	589	30.5	237	588	30.3
28	613	30.2	70	601	30.6	112	590	30.4	154	591	30.7	196	589	30.5	238	588	30.3
29	612	30.2	71	600	30.6	113	590	30.4	155	591	30.7	197	589	30.5	239	588	30.3
30	611	30.2	72	600	30.6	114	590	30.4	156	591	30.7	198	589	30.5	240	588	30.3
31	611	30.2	73	600	30.6	115	590	30.4	157	591	30.8	199	589	30.4			
32	610	30.2	74	601	30.6	116	590	30.4	158	591	30.8	200	589	30.4			
33	609	30.2	75	600	30.7	117	590	30.5	159	591	30.9	201	588	30.4			
34	609	30.2	76	599	30.7	118	590	30.5	160	592	30.9	202	588	30.4			
35	608	30.2	77	599	30.7	119	590	30.5	161	592	30.9	203	588	30.4			
36	608	30.2	78	598	30.7	120	590	30.5	162	592	30.9	204	588	30.3			
37	607	30.3	79	598	30.7	121	590	30.6	163	592	30.9	205	588	30.4			
38	607	30.3	80	597	30.7	122	590	30.6	164	592	30.9	206	588	30.4			
39	606	30.3	81	596	30.8	123	590	30.6	165	592	31	207	588	30.4			
40	606	30.3	82	596	30.7	124	590	30.6	166	592	31	208	588	30.3			

A.1.6 Initial pressure: 900 psi Injection time: 33.8 sec

Time	P	T	41	673	30.4	83	654	30.1	125	645	29.9	167	641	30	209	639	30.1
0	900	32.4	42	672	30.3	84	654	30.1	126	645	29.9	168	641	30	210	639	30.1
1	826	32.6	43	672	30.3	85	654	30.1	127	645	29.8	169	641	30	211	639	30.1
2	807	32.3	44	671	30.3	86	653	30.1	128	645	29.9	170	641	30	212	639	30.1
3	794	32.1	45	670	30.3	87	653	30.1	129	644	29.9	171	641	30	213	639	30.2
4	784	32	46	670	30.3	88	653	30.1	130	644	29.9	172	641	30	214	639	30.1
5	775	31.9	47	669	30.3	89	652	30.1	131	644	29.8	173	641	30	215	639	30.1
6	767	31.7	48	669	30.3	90	652	30.1	132	644	29.9	174	641	30	216	639	30.2
7	759	31.7	49	668	30.3	91	652	30.1	133	644	29.9	175	641	30	217	639	30.2
8	753	31.6	50	668	30.3	92	651	30	134	644	29.8	176	641	30	218	639	30.2
9	747	31.5	51	667	30.3	93	651	30	135	644	29.9	177	641	30	219	640	30.2
10	742	31.5	52	667	30.3	94	651	30	136	643	29.9	178	640	30	220	640	30.2
11	737	31.4	53	666	30.3	95	651	30	137	643	29.9	179	640	30	221	639	30.1
12	732	31.3	54	666	30.3	96	650	30	138	643	29.9	180	640	30	222	639	30.1
13	727	31.3	55	665	30.3	97	650	30	139	643	29.9	181	640	30	223	639	30.2
14	723	31.3	56	665	30.3	98	650	30	140	643	29.9	182	640	30	224	639	30.2
15	719	31.3	57	664	30.3	99	650	30	141	643	30	183	640	30	225	639	30.2
16	715	31.2	58	664	30.3	100	650	30	142	643	30	184	640	30	226	639	30.2
17	712	31.2	59	663	30.3	101	649	30	143	643	30	185	640	30	227	639	30.2
18	708	31.1	60	663	30.3	102	649	30	144	643	29.9	186	640	30	228	639	30.2
19	705	31.2	61	662	30.3	103	649	30	145	643	29.9	187	640	30	229	639	30.2
20	702	31.1	62	662	30.3	104	649	30	146	643	29.9	188	640	30	230	639	30.3
21	699	31.1	63	662	30.3	105	648	29.9	147	642	29.9	189	640	30	231	639	30.3
22	697	31.1	64	661	30.3	106	648	30	148	642	29.9	190	640	30	232	639	30.3
23	695	31	65	661	30.3	107	648	30	149	642	29.9	191	640	30	233	640	30.3
24	693	31.1	66	660	30.3	108	648	29.9	150	642	29.9	192	640	30	234	640	30.3
25	690	31	67	660	30.3	109	648	30	151	642	29.9	193	640	30	235	640	30.3
26	687	30.9	68	660	30.3	110	647	30	152	642	29.9	194	640	30	236	640	30.3
27	684	30.8	69	659	30.3	111	647	29.9	153	642	29.9	195	640	30	237	639	30.3
28	682	30.7	70	659	30.3	112	647	29.9	154	642	29.9	196	640	30.1	238	640	30.3
29	682	30.7	71	659	30.2	113	647	29.9	155	642	29.9	197	640	30.1	239	640	30.3
30	681	30.7	72	658	30.2	114	647	29.9	156	642	29.9	198	640	30.1	240	640	30.3
31	680	30.7	73	658	30.2	115	647	29.9	157	642	29.9	199	640	30.1			
32	679	30.6	74	657	30.2	116	646	29.9	158	641	29.9	200	640	30.1			
33	679	30.6	75	657	30.2	117	646	29.9	159	641	29.9	201	640	30.1			
34	678	30.6	76	657	30.2	118	646	29.9	160	641	29.9	202	640	30.1			
35	677	30.5	77	656	30.2	119	646	29.9	161	641	29.9	203	640	30.1			
36	676	30.5	78	656	30.2	120	646	29.9	162	641	29.9	204	640	30.1			
37	675	30.5	79	656	30.2	121	646	29.9	163	641	29.9	205	640	30.1			
38	675	30.5	80	655	30.1	122	645	29.9	164	641	29.9	206	640	30.1			
39	674	30.4	81	655	30.1	123	645	29.9	165	641	30	207	639	30.1			
40	674	30.4	82	655	30.1	124	645	29.9	166	641	30	208	639	30.1			

A.1.7 Initial pressure: 950 psi Injection time: 18.2 sec

Time	P	T	41	776	30.3	83	756	30.5	125	743	30.7	167	725	30.6	209	709	30.1
0	950	30.7	42	775	30.3	84	756	30.6	126	743	30.7	168	724	30.6	210	709	30.1
1	892	31.9	43	774	30.3	85	756	30.6	127	742	30.7	169	724	30.6	211	709	30.1
2	877	31.5	44	774	30.3	86	756	30.6	128	742	30.6	170	724	30.6	212	709	30.1
3	868	31	45	773	30.4	87	755	30.6	129	741	30.7	171	724	30.6	213	709	30
4	861	30.9	46	772	30.4	88	755	30.6	130	741	30.7	172	723	30.6	214	709	30
5	855	30.6	47	772	30.4	89	755	30.6	131	741	30.7	173	723	30.6	215	709	29.9
6	849	30.6	48	771	30.4	90	755	30.6	132	740	30.7	174	723	30.6	216	709	29.9
7	844	30.5	49	770	30.4	91	754	30.6	133	740	30.7	175	723	30.6	217	709	29.9
8	839	30.5	50	770	30.4	92	754	30.6	134	740	30.8	176	722	30.6	218	709	29.8
9	835	30.4	51	769	30.4	93	754	30.6	135	739	30.9	177	722	30.6	219	709	29.8
10	832	30.4	52	769	30.4	94	753	30.6	136	739	31	178	722	30.7	220	709	29.7
11	828	30.4	53	768	30.4	95	753	30.6	137	739	31.1	179	722	30.7	221	708	29.7
12	825	30.4	54	768	30.4	96	753	30.6	138	739	31.1	180	721	30.7	222	708	29.6
13	821	30.4	55	767	30.4	97	752	30.6	139	738	31.2	181	721	30.8	223	708	29.7
14	819	30.4	56	767	30.4	98	752	30.6	140	738	31.2	182	721	30.7	224	708	29.6
15	816	30.4	57	766	30.4	99	751	30.6	141	737	31.3	183	721	30.7	225	708	29.6
16	813	30.4	58	766	30.4	100	751	30.6	142	735	31.3	184	721	30.7	226	708	29.6
17	810	30.4	59	765	30.4	101	751	30.6	143	734	31.1	185	720	30.7	227	708	29.6
18	808	30.4	60	765	30.4	102	750	30.6	144	733	31	186	720	30.7	228	708	29.6
19	805	30.4	61	764	30.4	103	750	30.6	145	733	31	187	720	30.8	229	707	29.6
20	803	30.4	62	764	30.4	104	750	30.6	146	732	30.8	188	720	30.8	230	707	29.6
21	801	30.4	63	764	30.4	105	749	30.6	147	731	30.8	189	720	30.8	231	707	29.6
22	800	30.4	64	763	30.4	106	749	30.6	148	731	30.8	190	719	30.8	232	707	29.6
23	798	30.3	65	763	30.4	107	748	30.6	149	730	30.8	191	717	30.8	233	707	29.6
24	796	30.4	66	762	30.4	108	748	30.6	150	730	30.7	192	716	30.7	234	707	29.6
25	795	30.4	67	762	30.4	109	748	30.6	151	729	30.7	193	716	30.6	235	707	29.6
26	793	30.3	68	762	30.4	110	747	30.6	152	729	30.7	194	715	30.5	236	707	29.6
27	792	30.3	69	761	30.4	111	747	30.6	153	729	30.7	195	714	30.4	237	706	29.6
28	790	30.3	70	761	30.4	112	747	30.6	154	728	30.7	196	714	30.3	238	706	29.6
29	789	30.3	71	760	30.4	113	746	30.6	155	728	30.6	197	713	30.3	239	706	29.6
30	787	30.3	72	760	30.5	114	746	30.6	156	727	30.6	198	713	30.2	240	706	29.6
31	786	30.3	73	760	30.5	115	746	30.6	157	727	30.6	199	713	30.2			
32	784	30.3	74	759	30.5	116	746	30.6	158	727	30.6	200	712	30.2			
33	783	30.3	75	759	30.5	117	745	30.6	159	727	30.6	201	712	30.1			
34	782	30.3	76	759	30.5	118	745	30.6	160	726	30.6	202	711	30.1			
35	781	30.3	77	758	30.5	119	745	30.6	161	726	30.6	203	711	30.1			
36	780	30.3	78	758	30.5	120	744	30.6	162	726	30.6	204	711	30.1			
37	779	30.3	79	758	30.5	121	744	30.6	163	726	30.6	205	711	30.1			
38	778	30.3	80	757	30.5	122	744	30.7	164	725	30.6	206	710	30.1			
39	777	30.3	81	757	30.5	123	744	30.7	165	725	30.6	207	710	30.1			
40	777	30.3	82	757	30.5	124	743	30.6	166	725	30.6	208	710	30.1			

A.2 Crude oil at 30 degree of Celsius (Experiment 2)

A.2.1 Initial pressure: 500 psi Injection time: 22.3 sec

Time	P	T	40	348	30.3	81	338	29.7	122	336	31.1	163	333	29.9	204	334	30.9
0	500	30.5	41	348	30.4	82	339	29.8	123	335	31.1	164	333	30	205	334	30.8
1	463	31.8	42	347	30.3	83	339	30	124	335	31.1	165	333	30	206	334	30.8
2	447	32.1	43	347	30.3	84	339	30	125	335	31.1	166	333	30.1	207	333	30.8
3	438	32.1	44	346	30.3	85	339	30.1	126	335	31	167	333	30.1	208	334	30.8
4	431	32	45	346	30.2	86	339	30.2	127	335	31	168	333	30.2	209	333	30.8
5	424	32	46	345	30.2	87	339	30.3	128	334	31	169	333	30.3	210	333	30.8
6	418	32	47	344	30.2	88	339	30.5	129	334	30.9	170	333	30.3	211	334	30.8
7	412	31.9	48	344	30.2	89	339	30.6	130	334	30.8	171	333	30.4	212	333	30.8
8	407	31.9	49	344	30.2	90	339	30.6	131	334	30.7	172	333	30.4	213	333	30.8
9	402	31.8	50	343	30.2	91	339	30.7	132	333	30.7	173	334	30.4	214	333	30.8
10	398	31.7	51	343	30.2	92	339	30.8	133	333	30.6	174	334	30.5	215	333	30.8
11	394	31.7	52	343	30.2	93	339	30.8	134	333	30.6	175	334	30.5	216	333	30.8
12	390	31.6	53	342	30.2	94	339	30.8	135	333	30.4	176	334	30.5	217	333	30.8
13	387	31.6	54	342	30.1	95	339	30.9	136	333	30.4	177	334	30.5	218	333	30.8
14	384	31.5	55	342	30.1	96	339	30.9	137	333	30.4	178	334	30.5	219	333	30.8
15	382	31.5	56	341	30.1	97	339	31	138	332	30.3	179	334	30.5	220	333	30.8
16	379	31.5	57	341	30.1	98	339	31.1	139	332	30.2	180	334	30.6	221	333	30.9
17	377	31.4	58	341	30.1	99	339	31.1	140	332	30.2	181	334	30.6	222	333	30.9
18	374	31.4	59	340	30.1	100	339	31.1	141	332	30.2	182	334	30.6	223	333	30.9
19	372	31.3	60	340	30.1	101	339	31.2	142	332	30.1	183	334	30.6	224	333	31
20	370	31.3	61	340	30.1	102	339	31.2	143	332	30.1	184	334	30.6	225	333	31
21	368	31.2	62	340	29.9	103	339	31.2	144	332	30	185	334	30.6	226	333	31.1
22	367	31.1	63	339	29.9	104	339	31.2	145	332	29.9	186	334	30.6	227	333	31.1
23	365	31	64	339	29.8	105	339	31.2	146	332	29.9	187	334	30.7	228	333	31.2
24	363	31	65	339	29.7	106	339	31.3	147	332	29.9	188	334	30.7	229	333	31.2
25	362	31	66	339	29.7	107	339	31.3	148	332	29.9	189	334	30.8	230	332	31.2
26	360	30.9	67	339	29.6	108	339	31.4	149	332	29.8	190	334	30.8	231	332	31.2
27	359	30.8	68	338	29.6	109	339	31.4	150	332	29.8	191	334	30.8	232	332	31.2
28	358	30.8	69	338	29.6	110	338	31.4	151	332	29.8	192	334	30.8	233	332	31
29	357	30.7	70	338	29.5	111	338	31.4	152	332	29.7	193	334	30.8	234	332	31
30	356	30.7	71	338	29.5	112	337	31.3	153	332	29.7	194	334	30.8	235	332	31
31	355	30.6	72	338	29.5	113	337	31.3	154	332	29.7	195	334	30.8	236	332	31
32	354	30.6	73	338	29.5	114	337	31.2	155	332	29.7	196	334	30.9	237	332	31
33	353	30.5	74	337	29.5	115	337	31.3	156	332	29.7	197	334	30.9	238	332	31
34	352	30.5	75	337	29.4	116	336	31.3	157	332	29.7	198	334	30.9	239	332	31
35	351	30.5	76	337	29.4	117	336	31.2	158	332	29.7	199	334	30.9	240	332	31
36	351	30.4	77	338	29.4	118	336	31.2	159	332	29.7	200	334	30.9			
37	350	30.4	78	338	29.5	119	336	31.2	160	332	29.8	201	334	30.9			
38	349	30.4	79	338	29.5	120	336	31.2	161	333	29.8	202	334	30.9			
39	349	30.4	80	338	29.6	121	336	31.2	162	333	29.8	203	334	30.8			

A.2.2 Initial pressure: 600 psi Injection time: 23.1 sec

Time	P	T	41	429	30.8	83	414	30.2	125	412	30.4	167	410	30.3	209	408	30
0	600	30.4	42	428	30.8	84	414	30.2	126	412	30.4	168	410	30.3	210	408	30
1	561	31.5	43	428	30.8	85	413	30.2	127	412	30.4	169	410	30.3	211	408	30
2	547	31.3	44	427	30.8	86	413	30.2	128	412	30.4	170	410	30.3	212	408	30
3	535	30.9	45	427	30.8	87	413	30.1	129	412	30.4	171	410	30.2	213	408	29.9
4	525	30.6	46	426	30.8	88	413	30.1	130	412	30.4	172	410	30.2	214	408	29.9
5	516	30.3	47	425	30.8	89	413	30.1	131	411	30.4	173	410	30.3	215	408	29.9
6	508	30.1	48	425	30.8	90	412	30.1	132	411	30.4	174	410	30.3	216	408	29.9
7	502	30	49	424	30.8	91	412	30.1	133	411	30.4	175	410	30.3	217	408	29.9
8	496	29.9	50	424	30.7	92	412	30	134	411	30.4	176	410	30.3	218	408	29.8
9	492	29.9	51	423	30.7	93	412	30	135	411	30.4	177	409	30.3	219	407	29.8
10	487	29.9	52	423	30.7	94	413	30	136	411	30.4	178	409	30.3	220	407	29.8
11	483	29.9	53	422	30.7	95	413	30	137	411	30.4	179	409	30.3	221	407	29.8
12	479	29.9	54	422	30.7	96	413	30.1	138	411	30.4	180	409	30.3	222	407	29.8
13	475	29.9	55	421	30.7	97	413	30.1	139	411	30.4	181	409	30.3	223	407	29.8
14	471	29.9	56	421	30.7	98	413	30.2	140	411	30.4	182	409	30.2	224	407	29.7
15	468	30	57	420	30.7	99	413	30.2	141	411	30.4	183	409	30.2	225	407	29.7
16	465	30.1	58	420	30.6	100	413	30.3	142	411	30.4	184	409	30.2	226	407	29.7
17	462	30.2	59	419	30.6	101	413	30.2	143	411	30.4	185	409	30.2	227	407	29.7
18	460	30.2	60	419	30.6	102	413	30.2	144	411	30.4	186	409	30.2	228	407	29.7
19	457	30.3	61	419	30.6	103	413	30.3	145	411	30.4	187	409	30.2	229	407	29.7
20	455	30.4	62	419	30.6	104	413	30.3	146	411	30.4	188	409	30.2	230	407	29.7
21	452	30.4	63	418	30.6	105	413	30.3	147	411	30.4	189	409	30.2	231	407	29.6
22	451	30.5	64	418	30.6	106	413	30.4	148	411	30.4	190	409	30.2	232	407	29.6
23	449	30.4	65	418	30.5	107	413	30.4	149	411	30.3	191	409	30.2	233	407	29.6
24	447	30.5	66	417	30.5	108	413	30.4	150	411	30.4	192	409	30.2	234	407	29.6
25	445	30.5	67	417	30.4	109	413	30.5	151	411	30.4	193	409	30.2	235	407	29.6
26	444	30.6	68	417	30.4	110	413	30.5	152	410	30.4	194	409	30.2	236	407	29.6
27	442	30.6	69	417	30.4	111	413	30.5	153	410	30.4	195	409	30.2	237	407	29.6
28	441	30.6	70	416	30.4	112	413	30.5	154	410	30.4	196	409	30.2	238	407	29.6
29	440	30.6	71	416	30.4	113	413	30.5	155	410	30.4	197	409	30.1	239	407	29.6
30	438	30.6	72	416	30.4	114	412	30.5	156	410	30.4	198	409	30.1	240	407	29.6
31	437	30.7	73	416	30.4	115	412	30.5	157	410	30.3	199	409	30.1			
32	436	30.7	74	415	30.3	116	412	30.5	158	410	30.4	200	409	30.1			
33	435	30.7	75	415	30.3	117	412	30.5	159	410	30.4	201	409	30.1			
34	434	30.7	76	415	30.3	118	412	30.5	160	410	30.4	202	408	30.1			
35	434	30.7	77	415	30.3	119	412	30.5	161	410	30.4	203	408	30.1			
36	433	30.8	78	415	30.3	120	412	30.5	162	410	30.4	204	408	30.1			
37	432	30.8	79	414	30.3	121	412	30.5	163	410	30.4	205	408	30.1			
38	431	30.8	80	414	30.3	122	412	30.5	164	410	30.3	206	408	30.1			
39	430	30.8	81	414	30.3	123	412	30.5	165	410	30.3	207	408	30.1			
40	430	30.8	82	414	30.3	124	412	30.5	166	410	30.3	208	408	30			

A.2.3 Initial pressure: 700 psi Injection time: 18.2 sec

Time	P	T	41	476	29.7	83	470	30.9	125	458	30	167	458	29.2	209	464	30.1
0	700	30.2	42	476	29.6	84	470	30.9	126	458	29.9	168	458	29.2	210	464	30.2
1	638	32.4	43	475	29.7	85	470	30.9	127	458	29.9	169	458	29.2	211	464	30.2
2	616	32.1	44	475	29.7	86	470	30.9	128	458	29.9	170	458	29.2	212	464	30.2
3	601	31.6	45	474	29.6	87	470	30.9	129	458	29.9	171	458	29.2	213	465	30.3
4	588	31.2	46	474	29.6	88	470	30.9	130	458	29.9	172	458	29.2	214	465	30.3
5	577	30.9	47	473	29.6	89	470	30.9	131	458	29.9	173	458	29.2	215	465	30.4
6	567	30.7	48	473	29.7	90	469	30.9	132	458	30	174	458	29.2	216	465	30.4
7	560	30.6	49	472	29.7	91	469	30.9	133	458	30	175	458	29.2	217	465	30.4
8	553	30.5	50	471	29.7	92	468	30.9	134	458	29.9	176	458	29.2	218	465	30.5
9	547	30.4	51	471	29.7	93	468	30.8	135	458	29.9	177	458	29.2	219	465	30.5
10	541	30.4	52	471	29.7	94	467	30.8	136	458	29.9	178	458	29.2	220	466	30.5
11	536	30.3	53	470	29.6	95	467	30.7	137	458	29.9	179	458	29.2	221	466	30.5
12	531	30.1	54	470	29.6	96	466	30.7	138	458	29.9	180	458	29.2	222	466	30.6
13	526	30.1	55	470	29.6	97	466	30.6	139	458	29.9	181	458	29.2	223	466	30.6
14	522	30.1	56	470	29.6	98	465	30.5	140	458	30	182	458	29.2	224	466	30.6
15	518	30.1	57	470	29.8	99	465	30.5	141	458	29.9	183	458	29.2	225	466	30.6
16	515	30.1	58	471	29.8	100	465	30.4	142	458	29.8	184	458	29.2	226	466	30.6
17	512	30	59	471	29.9	101	464	30.3	143	458	29.7	185	458	29.2	227	466	30.6
18	509	30	60	471	30	102	464	30.3	144	458	29.6	186	458	29.2	228	466	30.6
19	506	30	61	471	30.1	103	463	30.3	145	458	29.6	187	458	29.2	229	466	30.6
20	504	30	62	471	30.2	104	463	30.3	146	458	29.5	188	458	29.2	230	466	30.7
21	501	30	63	471	30.2	105	463	30.3	147	458	29.4	189	458	29.2	231	466	30.7
22	499	29.9	64	471	30.3	106	462	30.2	148	458	29.4	190	458	29.2	232	466	30.7
23	497	29.9	65	471	30.3	107	462	30.2	149	458	29.3	191	458	29.2	233	466	30.7
24	495	29.9	66	471	30.4	108	462	30.2	150	458	29.3	192	458	29.2	234	466	30.7
25	494	29.8	67	471	30.5	109	461	30.2	151	458	29.3	193	458	29.2	235	466	30.7
26	492	29.8	68	471	30.5	110	461	30.1	152	458	29.3	194	458	29.2	236	465	30.7
27	490	29.8	69	471	30.6	111	461	30.1	153	458	29.3	195	458	29.2	237	465	30.6
28	489	29.8	70	471	30.6	112	460	30.1	154	458	29.2	196	458	29.2	238	464	30.6
29	487	29.8	71	471	30.6	113	460	30.1	155	458	29.2	197	458	29.3	239	464	30.6
30	486	29.8	72	471	30.6	114	460	30.1	156	458	29.2	198	459	29.3	240	464	30.6
31	485	29.8	73	471	30.7	115	460	30.1	157	458	29.2	199	459	29.3			
32	484	29.7	74	471	30.7	116	460	30.1	158	458	29.2	200	460	29.4			
33	483	29.7	75	471	30.7	117	459	30.1	159	458	29.2	201	460	29.5			
34	482	29.7	76	471	30.7	118	459	30.1	160	458	29.2	202	461	29.5			
35	481	29.7	77	471	30.8	119	459	30	161	458	29.2	203	461	29.6			
36	480	29.7	78	470	30.9	120	459	30	162	458	29.2	204	462	29.7			
37	479	29.7	79	470	30.9	121	459	30	163	458	29.2	205	462	29.8			
38	479	29.7	80	470	30.9	122	459	29.9	164	458	29.2	206	462	29.9			
39	478	29.7	81	470	30.9	123	459	29.9	165	458	29.2	207	463	30			
40	477	29.7	82	470	30.9	124	459	30	166	458	29.2	208	463	30			

A.2.4 Initial pressure: 800 psi Injection time: 23.2 sec

Time	P	T	41	545	30.2	83	535	29.4	125	545	30.5	167	543	30.5	209	540	30.4
0	800	30.4	42	544	30.1	84	535	29.4	126	545	30.5	168	543	30.5	210	540	30.4
1	749	32.5	43	543	30.1	85	535	29.3	127	545	30.5	169	543	30.5	211	539	30.4
2	718	32.5	44	543	30	86	535	29.3	128	545	30.5	170	542	30.5	212	539	30.4
3	697	32.2	45	542	30	87	535	29.4	129	545	30.5	171	542	30.5	213	539	30.4
4	680	31.8	46	542	30	88	535	29.3	130	545	30.5	172	542	30.5	214	539	30.4
5	666	31.7	47	541	30	89	535	29.3	131	545	30.5	173	542	30.5	215	539	30.4
6	653	31.5	48	541	30	90	535	29.3	132	544	30.5	174	542	30.4	216	539	30.4
7	642	31.5	49	540	29.9	91	535	29.3	133	544	30.5	175	541	30.4	217	539	30.4
8	632	31.4	50	540	29.9	92	536	29.3	134	544	30.5	176	543	30.4	218	539	30.3
9	623	31.4	51	539	29.8	93	536	29.3	135	544	30.5	177	543	30.4	219	539	30.3
10	616	31.4	52	539	29.8	94	537	29.4	136	544	30.5	178	543	30.4	220	539	30.2
11	609	31.4	53	539	29.8	95	538	29.6	137	544	30.5	179	543	30.4	221	538	30.2
12	603	31.4	54	539	29.7	96	538	29.7	138	544	30.5	180	542	30.4	222	538	30.3
13	598	31.4	55	538	29.7	97	539	29.8	139	544	30.4	181	542	30.4	223	538	30.3
14	593	31.4	56	538	29.7	98	540	29.9	140	544	30.4	182	542	30.4	224	538	30.3
15	588	31.4	57	537	29.7	99	541	30	141	544	30.4	183	542	30.4	225	538	30.3
16	584	31.4	58	537	29.6	100	541	30.2	142	544	30.4	184	542	30.4	226	538	30.3
17	580	31.2	59	537	29.6	101	542	30.3	143	544	30.4	185	542	30.4	227	538	30.3
18	576	31.2	60	537	29.5	102	542	30.3	144	544	30.4	186	542	30.4	228	538	30.3
19	573	31.2	61	537	29.5	103	543	30.4	145	544	30.4	187	542	30.4	229	538	30.3
20	571	31.2	62	537	29.5	104	543	30.5	146	544	30.4	188	542	30.4	230	538	30.3
21	568	31.1	63	536	29.5	105	544	30.6	147	544	30.4	189	542	30.4	231	538	30.2
22	566	31.1	64	536	29.5	106	544	30.6	148	544	30.4	190	542	30.4	232	538	30.2
23	564	31.1	65	536	29.4	107	544	30.7	149	543	30.4	191	542	30.4	233	537	30.2
24	563	31	66	536	29.4	108	545	30.7	150	543	30.4	192	543	30.4	234	537	30.1
25	561	30.9	67	536	29.4	109	545	30.7	151	543	30.4	193	541	30.4	235	537	30.1
26	560	30.9	68	536	29.4	110	545	30.8	152	543	30.4	194	541	30.4	236	537	30
27	559	30.8	69	536	29.4	111	545	30.8	153	543	30.4	195	541	30.4	237	537	30
28	557	30.7	70	536	29.4	112	546	30.8	154	543	30.4	196	541	30.4	238	537	30
29	556	30.7	71	536	29.4	113	546	30.8	155	543	30.4	197	541	30.4	239	537	30
30	555	30.6	72	536	29.4	114	546	30.8	156	544	30.5	198	541	30.4	240	537	30
31	554	30.6	73	536	29.4	115	546	30.8	157	544	30.5	199	540	30.4			
32	553	30.5	74	536	29.4	116	546	30.8	158	543	30.5	200	540	30.4			
33	552	30.5	75	535	29.4	117	546	30.7	159	543	30.5	201	540	30.4			
34	551	30.5	76	535	29.4	118	546	30.7	160	543	30.5	202	540	30.4			
35	550	30.4	77	535	29.3	119	545	30.7	161	543	30.5	203	540	30.4			
36	549	30.4	78	535	29.4	120	545	30.7	162	543	30.5	204	540	30.4			
37	548	30.3	79	535	29.3	121	545	30.7	163	543	30.5	205	540	30.4			
38	547	30.3	80	535	29.3	122	545	30.7	164	543	30.5	206	540	30.4			
39	546	30.2	81	535	29.4	123	545	30.7	165	544	30.5	207	540	30.4			
40	545	30.2	82	535	29.4	124	545	30.6	166	544	30.5	208	540	30.4			

A.2.5 Initial pressure: 850 psi Injection time: 24.0 sec

Time	P	T	41	615	30.6	83	586	30.6	125	576	30.4	167	574	30.3	209	573	30.2
0	850	30.3	42	613	30.6	84	586	30.7	126	576	30.4	168	574	30.3	210	573	30.2
1	795	31.8	43	612	30.6	85	585	30.6	127	576	30.4	169	574	30.3	211	573	30.2
2	771	31.6	44	611	30.6	86	585	30.7	128	576	30.5	170	574	30.3	212	573	30.2
3	754	31.3	45	610	30.6	87	585	30.7	129	576	30.5	171	574	30.3	213	573	30.2
4	742	31	46	608	30.6	88	584	30.7	130	576	30.5	172	574	30.3	214	573	30.2
5	733	30.8	47	607	30.6	89	584	30.6	131	576	30.5	173	573	30.3	215	573	30.3
6	725	30.7	48	606	30.6	90	584	30.6	132	576	30.5	174	573	30.3	216	573	30.3
7	718	30.7	49	606	30.6	91	583	30.7	133	576	30.4	175	573	30.3	217	572	30.3
8	711	30.7	50	605	30.6	92	583	30.7	134	576	30.4	176	573	30.3	218	572	30.2
9	705	30.7	51	604	30.6	93	583	30.7	135	576	30.4	177	573	30.3	219	572	30.2
10	699	30.7	52	603	30.5	94	582	30.6	136	575	30.5	178	573	30.2	220	572	30.2
11	694	30.7	53	602	30.5	95	582	30.6	137	575	30.5	179	573	30.2	221	572	30.2
12	689	30.8	54	601	30.5	96	582	30.6	138	575	30.5	180	573	30.2	222	572	30.2
13	684	30.7	55	600	30.5	97	581	30.6	139	575	30.5	181	573	30.3	223	572	30.2
14	680	30.8	56	599	30.5	98	581	30.6	140	575	30.4	182	573	30.3	224	572	30.2
15	676	30.8	57	599	30.5	99	581	30.6	141	575	30.4	183	573	30.3	225	572	30.2
16	672	30.7	58	598	30.4	100	580	30.6	142	575	30.4	184	573	30.3	226	572	30.2
17	668	30.8	59	597	30.4	101	580	30.6	143	575	30.4	185	573	30.3	227	572	30.2
18	664	30.8	60	596	30.4	102	580	30.6	144	575	30.4	186	573	30.3	228	572	30.2
19	661	30.8	61	596	30.4	103	580	30.6	145	575	30.4	187	573	30.3	229	572	30.2
20	658	30.8	62	595	30.4	104	580	30.6	146	575	30.4	188	573	30.3	230	572	30.2
21	655	30.8	63	594	30.4	105	579	30.6	147	575	30.4	189	573	30.3	231	572	30.2
22	652	30.8	64	594	30.4	106	579	30.6	148	575	30.4	190	573	30.3	232	572	30.2
23	649	30.8	65	593	30.4	107	579	30.6	149	575	30.3	191	573	30.3	233	572	30.2
24	646	30.8	66	592	30.4	108	579	30.6	150	575	30.4	192	573	30.3	234	572	30.1
25	644	30.8	67	592	30.4	109	579	30.6	151	574	30.4	193	573	30.3	235	572	30.1
26	641	30.8	68	591	30.4	110	578	30.6	152	574	30.4	194	573	30.3	236	572	30.1
27	639	30.8	69	591	30.4	111	578	30.6	153	574	30.4	195	573	30.3	237	572	30.1
28	637	30.8	70	591	30.4	112	578	30.5	154	574	30.4	196	573	30.2	238	572	30.1
29	635	30.8	71	590	30.4	113	578	30.5	155	574	30.4	197	573	30.1	239	572	30.1
30	633	30.8	72	590	30.4	114	578	30.5	156	574	30.4	198	573	30.2	240	572	30.1
31	631	30.8	73	589	30.4	115	578	30.5	157	574	30.4	199	573	30.2			
32	629	30.7	74	589	30.4	116	578	30.5	158	574	30.4	200	573	30.2			
33	627	30.7	75	589	30.4	117	577	30.5	159	574	30.4	201	573	30.2			
34	625	30.7	76	589	30.5	118	577	30.5	160	574	30.4	202	573	30.2			
35	623	30.7	77	588	30.5	119	577	30.5	161	574	30.3	203	573	30.2			
36	622	30.7	78	588	30.5	120	577	30.5	162	574	30.3	204	573	30.2			
37	620	30.7	79	588	30.5	121	577	30.5	163	574	30.3	205	573	30.2			
38	619	30.7	80	587	30.5	122	577	30.5	164	574	30.3	206	573	30.2			
39	617	30.6	81	587	30.6	123	577	30.5	165	574	30.3	207	573	30.2			
40	616	30.6	82	586	30.6	124	577	30.4	166	574	30.3	208	573	30.2			

A.2.6 Initial pressure: 900 psi Injection time: 24.1 sec

Time	P	T	41	633	30.4	83	625	30.4	125	621	30.4	167	619	30.4	209	619	30.5
0	900	31.2	42	633	30.4	84	624	30.4	126	621	30.4	168	619	30.4	210	619	30.5
1	847	32.7	43	633	30.4	85	624	30.4	127	621	30.4	169	619	30.4	211	619	30.5
2	822	32.8	44	632	30.4	86	624	30.4	128	621	30.4	170	619	30.4	212	619	30.5
3	801	32.6	45	632	30.4	87	624	30.4	129	621	30.5	171	619	30.4	213	619	30.5
4	785	32.4	46	632	30.4	88	624	30.5	130	621	30.5	172	619	30.4	214	619	30.5
5	772	32.3	47	631	30.4	89	624	30.5	131	621	30.5	173	619	30.4	215	619	30.5
6	761	32.2	48	631	30.4	90	624	30.5	132	621	30.5	174	619	30.4	216	619	30.5
7	753	32.3	49	631	30.4	91	624	30.5	133	621	30.4	175	619	30.5	217	619	30.5
8	744	32.2	50	631	30.4	92	623	30.5	134	621	30.4	176	619	30.4	218	619	30.5
9	737	32.2	51	630	30.4	93	623	30.4	135	621	30.4	177	619	30.4	219	619	30.5
10	730	32.3	52	630	30.4	94	623	30.4	136	621	30.4	178	618	30.4	220	619	30.5
11	723	32.3	53	630	30.4	95	623	30.4	137	620	30.4	179	618	30.4	221	619	30.5
12	716	32.3	54	630	30.4	96	623	30.5	138	620	30.4	180	618	30.4	222	619	30.5
13	708	32.3	55	629	30.4	97	623	30.5	139	620	30.4	181	618	30.4	223	619	30.5
14	701	32.2	56	629	30.4	98	623	30.5	140	620	30.4	182	618	30.4	224	619	30.5
15	694	32	57	629	30.4	99	623	30.5	141	620	30.4	183	618	30.4	225	619	30.5
16	688	31.8	58	629	30.4	100	623	30.5	142	620	30.4	184	618	30.4	226	619	30.5
17	682	31.8	59	628	30.5	101	623	30.5	143	620	30.4	185	618	30.4	227	619	30.5
18	677	31.6	60	628	30.5	102	623	30.5	144	620	30.4	186	618	30.3	228	619	30.5
19	671	31.5	61	628	30.5	103	622	30.5	145	620	30.4	187	618	30.3	229	619	30.5
20	667	31.4	62	628	30.5	104	622	30.5	146	620	30.4	188	618	30.3	230	619	30.5
21	662	31.3	63	628	30.5	105	622	30.4	147	620	30.4	189	618	30.3	231	619	30.5
22	658	31.3	64	628	30.5	106	622	30.4	148	620	30.4	190	618	30.3	232	619	30.5
23	654	31.1	65	627	30.5	107	622	30.5	149	620	30.4	191	618	30.4	233	619	30.4
24	651	31.1	66	627	30.4	108	622	30.5	150	620	30.4	192	618	30.4	234	618	30.4
25	648	31.1	67	627	30.4	109	622	30.5	151	620	30.4	193	618	30.4	235	618	30.4
26	645	31	68	627	30.4	110	622	30.5	152	620	30.4	194	618	30.4	236	618	30.4
27	642	30.9	69	627	30.4	111	622	30.5	153	620	30.4	195	618	30.4	237	618	30.4
28	641	30.9	70	627	30.5	112	622	30.5	154	620	30.4	196	618	30.4	238	618	30.4
29	640	30.9	71	626	30.5	113	622	30.5	155	619	30.4	197	618	30.4	239	618	30.4
30	639	30.9	72	626	30.5	114	622	30.4	156	620	30.4	198	618	30.4	240	618	30.4
31	638	30.7	73	626	30.5	115	622	30.4	157	619	30.4	199	618	30.4			
32	638	30.7	74	626	30.5	116	622	30.4	158	619	30.4	200	618	30.4			
33	637	30.7	75	626	30.5	117	621	30.4	159	619	30.4	201	618	30.4			
34	636	30.6	76	625	30.5	118	621	30.5	160	619	30.4	202	618	30.4			
35	636	30.6	77	625	30.4	119	621	30.5	161	619	30.4	203	618	30.4			
36	635	30.6	78	625	30.4	120	621	30.5	162	619	30.4	204	618	30.4			
37	635	30.5	79	625	30.5	121	621	30.5	163	619	30.4	205	619	30.5			
38	635	30.5	80	625	30.5	122	621	30.5	164	619	30.4	206	619	30.5			
39	634	30.5	81	625	30.5	123	621	30.4	165	619	30.4	207	619	30.5			
40	634	30.5	82	625	30.5	124	621	30.4	166	619	30.5	208	619	30.5			

A.2.7 Initial pressure: 925 psi Injection time: 19.2 sec

Time	P	T	41	686	30.3	83	670	30.1	125	661	30.1	167	655	30.1	209	653	30
0	925	31.7	42	685	30.3	84	670	30.1	126	661	30.1	168	655	30.1	210	653	30
1	875	33	43	685	30.3	85	669	30.1	127	661	30.1	169	655	30.1	211	653	30
2	844	33.1	44	684	30.3	86	669	30.1	128	661	30.1	170	655	30.1	212	653	30
3	825	32.8	45	684	30.3	87	669	30.1	129	660	30.1	171	655	30.1	213	653	30.1
4	812	32.6	46	683	30.3	88	668	30.1	130	660	30.1	172	655	30.1	214	652	30.1
5	802	32.4	47	682	30.2	89	668	30.1	131	660	30.1	173	655	30.1	215	652	30.1
6	794	32.3	48	682	30.2	90	668	30.1	132	660	30.1	174	655	30	216	652	30
7	787	32.2	49	681	30.2	91	668	30.1	133	660	30.1	175	655	30	217	652	30
8	781	32.2	50	681	30.2	92	668	30.1	134	660	30.1	176	654	30	218	652	30
9	775	32.2	51	681	30.2	93	667	30.1	135	660	30.1	177	654	30	219	652	30
10	770	32.1	52	680	30.2	94	667	30.1	136	659	30.1	178	654	30	220	652	30
11	765	32.1	53	680	30.2	95	667	30.1	137	659	30.1	179	654	30	221	652	30
12	760	32.1	54	679	30.2	96	667	30.1	138	659	30.1	180	654	30	222	652	30
13	756	32.1	55	679	30.2	97	666	30.1	139	659	30.1	181	654	30	223	652	30
14	752	32.1	56	678	30.2	98	666	30.1	140	659	30.1	182	654	30	224	652	30
15	748	32	57	678	30.2	99	666	30.1	141	659	30.1	183	654	30	225	652	30
16	745	32.1	58	678	30.2	100	666	30.1	142	659	30.1	184	654	30	226	652	30
17	740	32	59	677	30.2	101	666	30.1	143	658	30.1	185	654	30	227	652	30.1
18	735	31.9	60	677	30.2	102	666	30.1	144	658	30.1	186	654	30	228	652	30
19	730	31.8	61	677	30.2	103	665	30.1	145	658	30.1	187	654	30	229	652	30
20	726	31.7	62	676	30.2	104	665	30.1	146	658	30.1	188	654	30	230	652	30
21	723	31.5	63	676	30.1	105	665	30.1	147	658	30.1	189	654	30	231	652	30
22	719	31.4	64	675	30.1	106	665	30.1	148	658	30.1	190	653	30	232	652	30
23	716	31.3	65	675	30.1	107	664	30.1	149	657	30.1	191	654	30	233	652	30
24	713	31.2	66	675	30.1	108	664	30.1	150	657	30.1	192	653	30.1	234	652	30
25	710	31.1	67	674	30.1	109	664	30.1	151	657	30.1	193	653	30.1	235	652	30
26	707	31	68	674	30.1	110	664	30.1	152	657	30.1	194	653	30	236	652	30
27	704	30.9	69	674	30.1	111	664	30.1	153	657	30.1	195	653	30	237	652	30
28	701	30.9	70	674	30.1	112	663	30.1	154	657	30.1	196	653	30	238	652	30
29	698	30.8	71	673	30.1	113	663	30.1	155	657	30.1	197	653	30	239	652	30
30	696	30.7	72	673	30.1	114	663	30.1	156	657	30.1	198	653	30	240	652	30
31	694	30.7	73	673	30.1	115	663	30.1	157	656	30.1	199	653	30			
32	693	30.7	74	672	30.1	116	663	30.1	158	656	30.1	200	653	30			
33	692	30.7	75	672	30.1	117	663	30.1	159	656	30.1	201	653	30			
34	691	30.7	76	672	30.1	118	662	30.1	160	656	30	202	653	30			
35	690	30.6	77	672	30.1	119	662	30.1	161	656	30	203	653	30			
36	689	30.6	78	671	30.1	120	662	30.1	162	656	30	204	653	30			
37	688	30.5	79	671	30.1	121	662	30.1	163	656	30	205	653	30			
38	688	30.5	80	671	30.1	122	662	30.1	164	656	30	206	653	30			
39	687	30.4	81	670	30.1	123	661	30.1	165	656	30.1	207	653	30			
40	686	30.4	82	670	30.1	124	661	30.1	166	655	30.1	208	653	30			

A.2.8 Initial pressure: 950 psi Injection time: 25.2 sec

Time	P	T	41	760	30.7	83	743	30.6	125	729	30.7	167	711	30.6	209	705	30.1
0	950	31.4	42	760	30.7	84	743	30.6	126	728	30.7	168	711	30.6	210	705	30.1
1	890	32.1	43	759	30.7	85	742	30.6	127	728	30.6	169	711	30.6	211	705	30.1
2	870	31.5	44	759	30.8	86	742	30.6	128	728	30.7	170	711	30.6	212	705	30
3	855	30.9	45	758	30.8	87	742	30.6	129	728	30.7	171	710	30.6	213	705	30
4	843	30.5	46	757	30.8	88	741	30.6	130	727	30.7	172	710	30.6	214	705	30
5	834	30.1	47	757	30.8	89	741	30.6	131	727	30.7	173	710	30.6	215	705	30
6	827	29.8	48	756	30.8	90	740	30.6	132	726	30.7	174	710	30.6	216	704	30
7	820	29.7	49	756	30.8	91	740	30.6	133	724	30.8	175	710	30.6	217	704	30
8	813	29.6	50	755	30.8	92	740	30.6	134	723	30.9	176	709	30.6	218	704	30
9	807	29.6	51	755	30.8	93	739	30.6	135	722	30.9	177	709	30.7	219	704	30
10	803	29.5	52	754	30.8	94	739	30.6	136	722	30.9	178	709	30.7	220	704	30
11	799	29.5	53	754	30.8	95	739	30.6	137	721	30.9	179	709	30.7	221	704	30
12	795	29.4	54	753	30.8	96	738	30.6	138	720	30.9	180	709	30.8	222	704	30
13	791	29.3	55	753	30.8	97	738	30.6	139	720	30.9	181	708	30.7	223	704	30
14	788	29.3	56	752	30.8	98	737	30.6	140	719	30.9	182	708	30.7	224	704	29.9
15	785	29.3	57	752	30.8	99	737	30.6	141	719	30.8	183	708	30.7	225	704	29.9
16	782	29.3	58	751	30.8	100	737	30.6	142	718	30.8	184	708	30.7	226	703	29.9
17	779	29.3	59	751	30.8	101	736	30.6	143	718	30.8	185	708	30.7	227	703	29.9
18	777	29.3	60	750	30.7	102	736	30.6	144	718	30.8	186	707	30.8	228	703	29.9
19	775	29.3	61	750	30.7	103	736	30.6	145	717	30.8	187	707	30.8	229	703	29.9
20	773	29.3	62	749	30.7	104	735	30.6	146	717	30.8	188	707	30.8	230	703	29.9
21	772	29.3	63	749	30.7	105	735	30.6	147	716	30.8	189	707	30.8	231	703	29.9
22	770	29.2	64	749	30.7	106	735	30.6	148	716	30.8	190	707	30.8	232	702	29.9
23	769	29.2	65	748	30.7	107	735	30.6	149	716	30.7	191	707	30.7	233	702	29.9
24	768	29.2	66	748	30.7	108	734	30.6	150	716	30.7	192	707	30.6	234	702	29.9
25	766	29.2	67	748	30.7	109	734	30.6	151	715	30.7	193	706	30.5	235	702	29.9
26	765	29.2	68	747	30.7	110	734	30.6	152	715	30.7	194	706	30.4	236	702	29.9
27	765	29.2	69	747	30.7	111	733	30.6	153	715	30.7	195	706	30.3	237	702	29.9
28	766	29.2	70	747	30.7	112	733	30.6	154	715	30.6	196	706	30.3	238	702	29.9
29	766	29.2	71	746	30.7	113	733	30.6	155	714	30.6	197	706	30.2	239	702	29.9
30	766	29.2	72	746	30.7	114	733	30.6	156	714	30.6	198	706	30.2	240	701	29.9
31	765	29.2	73	746	30.7	115	732	30.6	157	714	30.6	199	706	30.2			
32	765	29.2	74	745	30.6	116	732	30.6	158	714	30.6	200	706	30.1			
33	765	29.3	75	745	30.6	117	732	30.6	159	713	30.6	201	706	30.1			
34	764	29.5	76	745	30.6	118	731	30.6	160	713	30.6	202	706	30.1			
35	764	29.9	77	745	30.6	119	731	30.6	161	713	30.6	203	706	30.1			
36	763	30.1	78	744	30.6	120	730	30.6	162	713	30.6	204	706	30.1			
37	762	30.3	79	744	30.6	121	730	30.7	163	712	30.6	205	706	30.1			
38	762	30.5	80	744	30.6	122	730	30.7	164	712	30.6	206	705	30.1			
39	761	30.6	81	744	30.6	123	729	30.6	165	712	30.6	207	705	30.1			
40	761	30.7	82	743	30.6	124	729	30.7	166	712	30.6	208	705	30.1			

A.3 crude oil API 62.1 at 30 degree of Celsius (Experiment 3)

A.3.1 Initial pressure: 700 psi Injection time: 23.6 sec

Time	T	P	40	30.60	459	81	30.60	451	122	30.00	447	163	31.70	456	204	30.90	452
0	31.60	700	41	30.60	459	82	30.60	451	123	29.90	447	164	31.70	456	205	30.80	452
1	32.90	646	42	30.50	458	83	30.60	451	124	29.90	447	165	31.70	456	206	30.80	451
2	32.70	618	43	30.50	457	84	30.60	451	125	29.90	447	166	31.70	456	207	30.70	451
3	32.20	598	44	30.40	457	85	30.60	451	126	29.90	447	167	31.70	456	208	30.70	451
4	31.80	579	45	30.30	456	86	30.60	451	127	29.90	446	168	31.70	456	209	30.70	450
5	31.40	563	46	30.30	456	87	30.60	451	128	29.80	446	169	31.70	456	210	30.60	450
6	31.10	550	47	30.30	455	88	30.60	451	129	29.80	446	170	31.70	456	211	30.60	450
7	30.90	538	48	30.30	455	89	30.60	451	130	29.80	446	171	31.70	456	212	30.50	450
8	30.70	528	49	30.20	454	90	30.60	451	131	29.80	446	172	31.70	456	213	30.50	450
9	30.50	522	50	30.20	454	91	30.60	450	132	29.80	446	173	31.70	456	214	30.50	450
10	30.50	517	51	30.20	454	92	30.50	450	133	29.70	446	174	31.70	456	215	30.40	449
11	30.40	513	52	30.10	453	93	30.50	450	134	29.70	446	175	31.70	456	216	30.30	449
12	30.40	510	53	30.10	453	94	30.50	450	135	29.70	446	176	31.70	456	217	30.30	449
13	30.50	506	54	30.10	453	95	30.50	450	136	29.60	446	177	31.70	456	218	30.30	449
14	30.60	503	55	30.10	453	96	30.40	450	137	29.70	446	178	31.70	456	219	30.20	449
15	30.70	500	56	30.10	453	97	30.40	450	138	29.70	446	179	31.70	456	220	30.20	448
16	30.80	497	57	30.10	452	98	30.50	450	139	29.70	446	180	31.60	456	221	30.10	448
17	30.80	494	58	30.20	452	99	30.50	450	140	29.70	446	181	31.50	456	222	30.10	448
18	30.90	492	59	30.20	452	100	30.40	449	141	29.80	446	182	31.50	455	223	30.10	448
19	31.00	489	60	30.30	452	101	30.40	449	142	29.80	447	183	31.50	455	224	30.00	448
20	31.00	487	61	30.30	452	102	30.40	449	143	30.00	448	184	31.60	455	225	30.00	447
21	31.00	485	62	30.30	452	103	30.40	449	144	30.20	448	185	31.50	455	226	30.00	447
22	31.10	482	63	30.40	452	104	30.30	449	145	30.30	449	186	31.50	455	227	29.90	447
23	31.10	481	64	30.50	452	105	30.30	449	146	30.40	450	187	31.40	455	228	29.90	447
24	31.10	478	65	30.50	452	106	30.30	449	147	30.60	450	188	31.50	455	229	29.90	447
25	31.10	477	66	30.50	452	107	30.20	449	148	30.80	451	189	31.50	455	230	29.80	447
26	31.20	475	67	30.50	452	108	30.20	448	149	30.90	452	190	31.50	455	231	29.80	446
27	31.20	474	68	30.60	452	109	30.20	448	150	31.00	452	191	31.40	455	232	29.80	446
28	31.30	472	69	30.60	452	110	30.20	448	151	31.10	453	192	31.40	454	233	29.70	446
29	31.30	471	70	30.60	452	111	30.20	448	152	31.30	453	193	31.30	454	234	29.70	446
30	31.20	470	71	30.70	452	112	30.10	448	153	31.40	454	194	31.30	454	235	29.60	446
31	31.20	468	72	30.70	452	113	30.10	448	154	31.40	454	195	31.30	454	236	29.60	446
32	31.10	467	73	30.70	452	114	30.10	448	155	31.50	455	196	31.30	454	237	29.60	446
33	31.10	466	74	30.70	452	115	30.10	448	156	31.50	455	197	31.30	453	238	29.60	445
34	31.10	465	75	30.70	452	116	30.10	448	157	31.60	455	198	31.20	453	239	29.50	445
35	30.90	464	76	30.70	452	117	30.00	448	158	31.60	455	199	31.10	453	240	29.50	445
36	30.90	463	77	30.70	452	118	30.00	447	159	31.60	456	200	31.10	453			
37	30.80	462	78	30.70	451	119	30.00	447	160	31.60	456	201	31.00	452			
38	30.70	461	79	30.70	451	120	30.00	447	161	31.70	456	202	31.00	452			
39	30.70	460	80	30.70	451	121	30.00	447	162	31.70	456	203	30.90	452			

A.3.2 Initial pressure: 800 psi Injection time: 21.2 sec

Time	T	P	40	30.20	529	81	30.20	519	122	30.10	518	163	29.90	517	204	29.80	518
0	31.30	800	41	30.20	529	82	30.20	519	123	30.10	518	164	29.90	517	205	29.80	518
1	32.60	739	42	30.30	528	83	30.20	519	124	30.10	517	165	29.90	517	206	29.80	517
2	32.40	711	43	30.20	528	84	30.20	519	125	30.10	517	166	29.90	517	207	29.80	518
3	31.90	689	44	30.20	527	85	30.20	519	126	30.10	517	167	29.90	517	208	29.70	518
4	31.60	668	45	30.20	527	86	30.20	519	127	30.10	517	168	29.90	517	209	29.80	517
5	31.30	650	46	30.20	526	87	30.20	519	128	30.10	517	169	29.90	517	210	29.80	518
6	31.00	635	47	30.20	526	88	30.20	519	129	30.10	517	170	29.90	517	211	29.80	518
7	30.80	621	48	30.20	526	89	30.20	519	130	30.10	518	171	29.90	517	212	29.80	518
8	30.60	609	49	30.20	525	90	30.20	519	131	30.10	517	172	29.90	517	213	29.80	518
9	30.50	598	50	30.20	525	91	30.20	519	132	30.10	517	173	29.90	517	214	29.80	518
10	30.40	589	51	30.20	524	92	30.20	518	133	30.10	517	174	29.90	517	215	29.80	518
11	30.30	581	52	30.20	524	93	30.20	518	134	30.00	517	175	29.90	517	216	29.80	518
12	30.20	574	53	30.20	524	94	30.20	518	135	30.00	517	176	29.80	517	217	29.80	518
13	30.10	568	54	30.20	524	95	30.20	518	136	30.00	517	177	29.80	517	218	29.80	518
14	30.00	562	55	30.20	523	96	30.20	518	137	30.00	517	178	29.80	517	219	29.80	518
15	30.10	557	56	30.20	523	97	30.20	518	138	30.00	517	179	29.80	517	220	29.80	518
16	30.00	555	57	30.20	523	98	30.10	518	139	30.00	517	180	29.80	517	221	29.80	518
17	30.00	554	58	30.20	523	99	30.10	518	140	30.00	517	181	29.80	517	222	29.80	518
18	30.00	552	59	30.20	522	100	30.10	518	141	30.00	517	182	29.80	517	223	29.80	518
19	30.00	550	60	30.20	522	101	30.10	518	142	30.00	517	183	29.80	517	224	29.80	518
20	30.00	549	61	30.20	522	102	30.10	518	143	30.00	517	184	29.90	517	225	29.80	518
21	30.00	547	62	30.20	522	103	30.10	518	144	30.00	517	185	29.80	517	226	29.70	518
22	30.00	545	63	30.20	522	104	30.10	518	145	30.00	517	186	29.80	517	227	29.70	518
23	30.00	544	64	30.20	521	105	30.10	518	146	29.90	517	187	29.80	517	228	29.80	518
24	30.00	542	65	30.20	521	106	30.10	518	147	29.90	517	188	29.80	517	229	29.80	518
25	30.00	541	66	30.20	521	107	30.10	518	148	29.90	517	189	29.80	517	230	29.80	518
26	30.00	540	67	30.20	521	108	30.10	518	149	29.90	517	190	29.80	518	231	29.80	518
27	30.00	539	68	30.20	521	109	30.10	518	150	29.90	517	191	29.80	518	232	29.80	518
28	30.00	538	69	30.20	521	110	30.10	518	151	29.90	517	192	29.80	517	233	29.80	518
29	30.00	537	70	30.20	520	111	30.10	518	152	30.00	517	193	29.80	518	234	29.80	518
30	30.00	536	71	30.20	520	112	30.10	518	153	29.90	517	194	29.80	518	235	29.80	518
31	30.00	535	72	30.20	520	113	30.10	518	154	29.90	517	195	29.80	517	236	29.80	518
32	30.00	534	73	30.20	520	114	30.10	518	155	29.80	517	196	29.80	518	237	29.80	518
33	30.00	534	74	30.20	520	115	30.10	518	156	29.90	517	197	29.80	518	238	29.80	518
34	30.00	533	75	30.20	520	116	30.10	518	157	29.90	517	198	29.80	518	239	29.80	518
35	30.10	532	76	30.20	520	117	30.10	518	158	29.90	517	199	29.80	517	240	29.80	518
36	30.10	531	77	30.20	520	118	30.10	517	159	29.90	517	200	29.80	517			
37	30.10	531	78	30.20	520	119	30.10	517	160	29.90	517	201	29.80	518			
38	30.10	530	79	30.20	519	120	30.10	518	161	29.90	517	202	29.80	517			
39	30.10	530	80	30.20	519	121	30.10	518	162	29.90	517	203	29.80	517			

A.3.3 Initial pressure: 850 psi Injection time: 26.7 sec

Time	T	P	40	30.70	571	81	30.20	559	122	29.90	555	163	30.80	560	204	30.70	559
0	31.70	850	41	30.70	570	82	30.20	559	123	29.90	555	164	30.80	560	205	30.60	558
1	32.90	790	42	30.70	569	83	30.20	559	124	29.90	555	165	30.80	560	206	30.60	558
2	32.50	758	43	30.60	569	84	30.20	559	125	29.90	555	166	30.80	560	207	30.50	557
3	31.90	729	44	30.60	568	85	30.20	558	126	29.90	555	167	30.80	560	208	30.40	557
4	31.40	705	45	30.60	568	86	30.20	558	127	29.80	555	168	30.80	561	209	30.40	557
5	31.10	684	46	30.60	567	87	30.20	558	128	29.80	555	169	30.80	560	210	30.40	557
6	30.90	667	47	30.60	567	88	30.20	558	129	29.80	555	170	30.90	561	211	30.40	557
7	30.70	652	48	30.60	566	89	30.20	558	130	29.80	555	171	30.90	561	212	30.30	556
8	30.50	640	49	30.60	566	90	30.10	558	131	29.80	555	172	30.90	561	213	30.20	556
9	30.40	631	50	30.60	566	91	30.20	558	132	29.80	555	173	30.90	561	214	30.20	556
10	30.50	626	51	30.60	565	92	30.20	558	133	29.80	555	174	30.90	561	215	30.20	556
11	30.50	621	52	30.60	565	93	30.20	557	134	29.80	555	175	30.90	561	216	30.20	556
12	30.50	617	53	30.60	565	94	30.20	557	135	29.80	555	176	30.90	561	217	30.20	556
13	30.60	613	54	30.60	564	95	30.10	557	136	29.80	555	177	30.90	561	218	30.10	556
14	30.60	609	55	30.60	564	96	30.10	557	137	29.80	555	178	30.90	561	219	30.10	555
15	30.60	606	56	30.60	564	97	30.10	557	138	29.80	555	179	30.90	561	220	30.10	555
16	30.60	603	57	30.50	563	98	30.10	557	139	29.80	555	180	30.90	561	221	30.10	555
17	30.60	601	58	30.50	563	99	30.10	557	140	29.70	555	181	30.90	561	222	30.10	555
18	30.70	598	59	30.50	563	100	30.10	557	141	29.70	555	182	30.90	561	223	30.10	555
19	30.70	596	60	30.50	563	101	30.10	557	142	29.70	555	183	30.90	561	224	30.10	555
20	30.70	594	61	30.50	562	102	30.10	557	143	29.70	555	184	30.90	561	225	30.10	555
21	30.80	592	62	30.50	562	103	30.10	557	144	29.80	555	185	30.90	561	226	30.10	555
22	30.80	590	63	30.50	562	104	30.10	557	145	29.80	555	186	30.90	561	227	30.10	555
23	30.80	588	64	30.50	562	105	30.10	557	146	29.90	556	187	30.80	561	228	30.00	555
24	30.80	587	65	30.50	561	106	30.10	557	147	30.00	556	188	30.80	561	229	30.00	555
25	30.80	585	66	30.50	561	107	30.10	556	148	30.10	557	189	30.80	561	230	30.00	555
26	30.80	584	67	30.40	561	108	30.00	556	149	30.10	557	190	30.80	561	231	30.00	555
27	30.80	582	68	30.40	561	109	30.00	556	150	30.20	557	191	30.80	561	232	30.00	555
28	30.80	581	69	30.40	561	110	30.00	556	151	30.30	558	192	30.80	561	233	30.00	555
29	30.80	580	70	30.40	561	111	30.00	556	152	30.40	558	193	30.70	560	234	30.00	555
30	30.80	579	71	30.40	560	112	30.00	556	153	30.40	558	194	30.70	561	235	30.00	555
31	30.80	578	72	30.40	560	113	30.00	556	154	30.50	558	195	30.80	560	236	30.00	555
32	30.80	577	73	30.40	560	114	30.00	556	155	30.50	559	196	30.70	560	237	30.00	555
33	30.80	576	74	30.40	560	115	30.00	556	156	30.70	559	197	30.70	560	238	30.00	555
34	30.80	575	75	30.40	560	116	30.00	556	157	30.70	559	198	30.70	560	239	30.00	555
35	30.80	574	76	30.30	560	117	30.00	556	158	30.70	559	199	30.70	560	240	30.00	555
36	30.80	573	77	30.30	559	118	29.90	556	159	30.70	560	200	30.70	560			
37	30.80	572	78	30.30	559	119	29.90	556	160	30.80	560	201	30.70	560			
38	30.70	572	79	30.30	559	120	29.90	556	161	30.80	560	202	30.70	560			
39	30.70	571	80	30.30	559	121	29.90	556	162	30.80	560	203	30.70	560			

A.3.4 Initial pressure: 900 psi Injection time: 23.1 sec

Time	T	P	40	30.30	673	81	30.10	640	122	29.80	626	163	30.30	619	204	30.10	612
0	31.30	900	41	30.30	672	82	30.10	639	123	29.80	625	164	30.30	619	205	30.10	612
1	32.20	830	42	30.30	671	83	30.00	639	124	29.80	625	165	30.30	618	206	30.10	612
2	31.50	798	43	30.30	670	84	30.00	638	125	29.80	625	166	30.30	618	207	30.10	612
3	30.70	778	44	30.30	669	85	30.00	638	126	29.80	625	167	30.30	618	208	30.10	612
4	30.30	767	45	30.30	668	86	30.00	637	127	29.80	624	168	30.30	618	209	30.10	612
5	29.90	758	46	30.30	667	87	30.00	637	128	29.80	624	169	30.30	618	210	30.10	611
6	29.60	752	47	30.30	665	88	30.00	636	129	29.80	624	170	30.30	617	211	30.10	611
7	29.60	745	48	30.30	664	89	30.00	636	130	29.90	624	171	30.30	617	212	30.10	611
8	29.50	741	49	30.30	663	90	30.00	636	131	29.90	624	172	30.30	617	213	30.00	611
9	29.50	737	50	30.30	662	91	30.00	635	132	29.90	624	173	30.30	617	214	30.00	611
10	29.40	734	51	30.30	661	92	30.00	635	133	30.00	624	174	30.30	617	215	30.00	611
11	29.50	731	52	30.30	660	93	30.00	634	134	30.00	624	175	30.30	617	216	30.00	611
12	29.70	727	53	30.30	659	94	30.00	634	135	30.10	624	176	30.30	616	217	30.00	611
13	29.70	724	54	30.20	659	95	30.00	634	136	30.10	624	177	30.30	616	218	30.00	611
14	29.70	721	55	30.20	657	96	30.00	633	137	30.10	624	178	30.30	616	219	30.00	610
15	29.80	719	56	30.20	657	97	30.00	633	138	30.20	623	179	30.30	616	220	30.00	610
16	29.80	716	57	30.20	656	98	29.90	633	139	30.20	623	180	30.30	616	221	30.00	610
17	29.80	714	58	30.20	655	99	30.00	632	140	30.20	623	181	30.30	616	222	30.00	610
18	29.90	711	59	30.20	654	100	30.00	632	141	30.20	623	182	30.30	615	223	30.00	610
19	30.00	709	60	30.20	653	101	30.00	632	142	30.30	623	183	30.30	615	224	30.00	610
20	30.00	707	61	30.20	653	102	30.00	631	143	30.30	623	184	30.30	615	225	30.00	610
21	30.10	705	62	30.20	652	103	30.00	631	144	30.30	622	185	30.20	615	226	30.00	610
22	30.10	703	63	30.20	651	104	30.00	631	145	30.30	622	186	30.20	615	227	29.90	610
23	30.10	701	64	30.10	650	105	29.90	630	146	30.30	622	187	30.20	615	228	29.90	610
24	30.10	699	65	30.20	649	106	29.90	630	147	30.30	622	188	30.20	614	229	29.90	610
25	30.10	697	66	30.20	649	107	29.90	629	148	30.30	622	189	30.20	614	230	29.90	609
26	30.10	695	67	30.20	648	108	29.90	629	149	30.30	621	190	30.20	614	231	29.90	609
27	30.10	693	68	30.20	647	109	29.90	629	150	30.30	621	191	30.20	614	232	29.90	609
28	30.10	691	69	30.20	647	110	29.90	629	151	30.30	621	192	30.20	614	233	29.90	609
29	30.20	690	70	30.20	646	111	29.90	628	152	30.30	621	193	30.20	614	234	29.90	609
30	30.20	688	71	30.10	645	112	29.90	628	153	30.30	621	194	30.20	614	235	29.80	609
31	30.20	686	72	30.10	645	113	29.90	628	154	30.30	620	195	30.20	613	236	29.80	609
32	30.20	685	73	30.10	644	114	29.90	628	155	30.30	620	196	30.20	613	237	29.90	609
33	30.20	683	74	30.10	644	115	29.90	627	156	30.30	620	197	30.20	613	238	29.90	609
34	30.30	682	75	30.10	643	116	29.90	627	157	30.30	620	198	30.10	613	239	29.90	609
35	30.30	680	76	30.10	642	117	29.80	627	158	30.30	620	199	30.10	613	240	29.90	608
36	30.30	679	77	30.10	642	118	29.80	627	159	30.30	620	200	30.10	613			
37	30.30	677	78	30.10	641	119	29.80	626	160	30.30	619	201	30.10	612			
38	30.30	676	79	30.10	641	120	29.80	626	161	30.30	619	202	30.10	612			
39	30.30	675	80	30.10	640	121	29.80	626	162	30.30	619	203	30.10	612			

A.3.5 Initial pressure: 950 psi Injection time: 25.0 sec

Time	T	P	40	30.50	713	81	30.20	704	122	30.60	707	163	29.90	702	204	29.70	699
0	32.70	950	41	30.50	712	82	30.20	704	123	30.60	707	164	29.90	702	205	29.70	699
1	32.40	889	42	30.40	712	83	30.20	705	124	30.60	706	165	29.90	702	206	29.70	699
2	32.00	835	43	30.40	711	84	30.30	705	125	30.60	706	166	29.90	702	207	29.70	699
3	31.80	811	44	30.40	711	85	30.40	705	126	30.50	706	167	29.90	702	208	29.70	699
4	31.80	792	45	30.40	711	86	30.40	705	127	30.50	706	168	29.90	702	209	29.60	699
5	31.70	777	46	30.40	710	87	30.50	705	128	30.50	706	169	29.90	701	210	29.60	699
6	31.60	766	47	30.30	710	88	30.50	705	129	30.50	706	170	29.80	701	211	29.60	699
7	31.50	761	48	30.30	709	89	30.50	706	130	30.50	706	171	29.80	701	212	29.60	699
8	31.50	757	49	30.30	709	90	30.60	706	131	30.50	706	172	29.80	701	213	29.60	699
9	31.50	753	50	30.30	709	91	30.50	706	132	30.50	706	173	29.80	701	214	29.60	699
10	31.50	750	51	30.30	708	92	30.50	706	133	30.50	706	174	29.80	701	215	29.60	699
11	31.40	747	52	30.20	708	93	30.60	706	134	30.50	706	175	29.80	701	216	29.60	699
12	31.40	744	53	30.20	708	94	30.60	706	135	30.40	706	176	29.80	701	217	29.60	699
13	31.50	741	54	30.20	707	95	30.60	706	136	30.40	705	177	29.80	701	218	29.60	699
14	31.40	739	55	30.20	707	96	30.60	706	137	30.40	705	178	29.80	701	219	29.60	699
15	31.40	737	56	30.20	707	97	30.60	707	138	30.30	705	179	29.90	701	220	29.60	699
16	31.30	735	57	30.20	707	98	30.60	707	139	30.30	705	180	29.90	701	221	29.60	699
17	31.20	733	58	30.20	706	99	30.60	707	140	30.30	705	181	29.90	701	222	29.60	699
18	31.20	732	59	30.10	706	100	30.60	707	141	30.30	705	182	29.90	701	223	29.60	699
19	31.10	730	60	30.10	706	101	30.60	707	142	30.30	705	183	29.90	701	224	29.60	699
20	31.10	729	61	30.10	706	102	30.60	707	143	30.30	705	184	29.90	701	225	29.60	699
21	31.10	727	62	30.10	705	103	30.60	707	144	30.30	704	185	29.90	700	226	29.60	699
22	31.10	726	63	30.10	705	104	30.60	707	145	30.20	704	186	29.90	700	227	29.60	699
23	31.00	725	64	30.10	705	105	30.60	707	146	30.20	704	187	29.90	700	228	29.60	699
24	31.00	724	65	30.10	704	106	30.60	707	147	30.20	704	188	29.90	700	229	29.60	699
25	30.90	723	66	30.10	704	107	30.60	707	148	30.20	704	189	29.90	700	230	29.60	699
26	30.90	722	67	30.10	704	108	30.60	707	149	30.10	704	190	29.90	700	231	29.60	699
27	30.80	721	68	30.10	704	109	30.60	707	150	30.10	704	191	29.80	700	232	29.60	699
28	30.80	720	69	30.00	704	110	30.60	707	151	30.10	703	192	29.70	700	233	29.60	699
29	30.80	719	70	30.00	703	111	30.60	707	152	30.20	703	193	29.70	700	234	29.60	699
30	30.70	719	71	30.00	703	112	30.60	707	153	30.10	703	194	29.70	700	235	29.60	699
31	30.70	718	72	29.90	703	113	30.60	707	154	30.10	703	195	29.70	700	236	29.60	699
32	30.60	717	73	29.90	703	114	30.60	707	155	30.00	703	196	29.70	700	237	29.60	699
33	30.60	717	74	29.90	703	115	30.60	707	156	30.00	703	197	29.70	700	238	29.60	699
34	30.60	716	75	29.90	703	116	30.60	707	157	30.00	703	198	29.70	700	239	29.60	699
35	30.60	715	76	29.90	703	117	30.60	707	158	30.00	703	199	29.70	700	240	29.60	699
36	30.60	715	77	30.00	703	118	30.60	707	159	30.00	702	200	29.80	700			
37	30.60	714	78	30.00	703	119	30.60	707	160	30.00	702	201	29.70	699			
38	30.60	714	79	30.10	704	120	30.60	707	161	30.00	702	202	29.70	699			
39	30.50	713	80	30.20	704	121	30.60	707	162	30.00	702	203	29.70	699			

A.4 n-pentane at 30 °C (Experiment 1)

A.4.1 I.P.: 400 psi, I.T.: 15.0 sec

A.4.2 I.P.: 500 psi, I.T.: 23.5 sec

Time	P	T	40	233	30.3	81	229	30.4	Time	P	T	40	301	30.7	81	292	29.3
0	400	30.1	41	233	30.4	82	229	30.4	0	500	30.3	41	301	30.7	82	292	29.3
1	257	30.5	42	233	30.5	83	229	30.4	1	335	31.1	42	300	30.8	83	292	29.2
2	244	30.7	43	233	30.5	84	229	30.4	2	316	31.2	43	300	30.7	84	292	29.2
3	239	30.7	44	233	30.5	85	229	30.4	3	303	31	44	299	30.7	85	292	29.1
4	237	30.7	45	233	30.5	86	229	30.4	4	301	30.9	45	299	30.7	86	292	29.1
5	236	30.8	46	232	30.6	87	229	30.4	5	299	30.7	46	298	30.7	87	292	29.1
6	235	30.8	47	231	30.5	88	229	30.4	6	298	30.6	47	298	30.7	88	292	29.1
7	234	30.8	48	231	30.6	89	229	30.4	7	298	30.5	48	298	30.6	89	292	29.1
8	233	30.8	49	231	30.5	90	229	30.4	8	297	30.5	49	297	30.6	90	293	29.1
9	233	30.8	50	230	30.5	91	229	30.4	9	297	30.3	50	297	30.6	91	294	29.2
10	232	30.8	51	230	30.5	92	229	30.4	10	297	30.3	51	297	30.6	92	295	29.2
11	232	30.7	52	230	30.5	93	229	30.4	11	297	30.2	52	297	30.6	93	295	29.3
12	231	30.7	53	230	30.5	94	229	30.4	12	297	30.1	53	297	30.6	94	296	29.4
13	230	30.6	54	230	30.5	95	229	30.4	13	297	30	54	297	30.6	95	297	29.5
14	230	30.5	55	230	30.4	96	229	30.4	14	297	29.9	55	296	30.5	96	297	29.6
15	230	30.4	56	229	30.5	97	229	30.4	15	297	29.9	56	296	30.6	97	298	29.7
16	229	30.4	57	229	30.5	98	229	30.4	16	297	29.9	57	296	30.5	98	298	29.8
17	229	30.2	58	229	30.4	99	229	30.4	17	297	29.8	58	296	30.5	99	298	29.8
18	228	30.1	59	229	30.4	100	229	30.4	18	297	29.8	59	296	30.5	100	299	29.9
19	228	30	60	229	30.4	101	229	30.4	19	297	29.8	60	296	30.5	101	299	29.9
20	228	29.9	61	229	30.4	102	229	30.4	20	297	29.8	61	296	30.5	102	299	30
21	228	29.8	62	229	30.4	103	229	30.4	21	297	29.8	62	296	30.5	103	299	30
22	228	29.8	63	229	30.4	104	229	30.4	22	297	29.8	63	295	30.5	104	299	30
23	228	29.8	64	229	30.4	105	229	30.4	23	297	29.7	64	295	30.4	105	299	30.1
24	228	29.8	65	229	30.4	106	229	30.4	24	297	29.7	65	295	30.3	106	299	30.1
25	228	29.7	66	229	30.4	107	229	30.4	25	297	29.7	66	294	30.4	107	299	30.2
26	229	29.7	67	229	30.4	108	229	30.4	26	297	29.8	67	294	30.3	108	300	30.2
27	229	29.7	68	229	30.4	109	229	30.4	27	297	29.8	68	294	30.1	109	300	30.3
28	229	29.7	69	229	30.4	110	229	30.4	28	298	29.8	69	293	30	110	299	30.2
29	230	29.7	70	229	30.4	111	229	30.4	29	298	29.8	70	293	30	111	299	30.2
30	230	29.7	71	229	30.4	112	229	30.4	30	299	29.8	71	293	29.9	112	299	30.2
31	231	29.8	72	229	30.4	113	229	30.4	31	299	29.8	72	292	29.8	113	298	30.2
32	231	29.9	73	229	30.4	114	229	30.4	32	300	29.9	73	292	29.7	114	298	30.2
33	232	29.9	74	229	30.4	115	229	30.4	33	301	30	74	292	29.6	115	297	30.2
34	232	30	75	229	30.4	116	229	30.4	34	302	30	75	292	29.6	116	297	30.1
35	232	30	76	229	30.4	117	229	30.4	35	302	30.1	76	292	29.5	117	297	30.1
36	232	30.1	77	229	30.4	118	229	30.4	36	302	30.2	77	292	29.5	118	296	30.1
37	232	30.1	78	229	30.4	119	229	30.4	37	302	30.5	78	292	29.5	119	296	30.1
38	233	30.3	79	229	30.4	120	229	30.4	38	302	30.6	79	292	29.4	120	296	30.1
39	233	30.2	80	229	30.4				39	302	30.6	80	292	29.4			

A.4.3 I.P.: 600 psi, I.T.: 23.2 sec

Time	P	T	40	332	30.2	81	331	30.3
0	600	30.5	41	332	30.2	82	331	30.3
1	451	31.7	42	332	30.2	83	331	30.3
2	374	31.6	43	332	30.2	84	331	30.3
3	354	31.5	44	332	30.2	85	331	30.3
4	345	31.4	45	332	30.2	86	331	30.3
5	340	31.2	46	332	30.2	87	331	30.3
6	337	31	47	332	30.2	88	331	30.3
7	335	30.9	48	332	30.2	89	331	30.3
8	334	30.8	49	332	30.2	90	331	30.4
9	333	30.7	50	332	30.2	91	331	30.4
10	332	30.6	51	331	30.2	92	331	30.4
11	331	30.5	52	332	30.2	93	332	30.4
12	331	30.4	53	331	30.2	94	332	30.4
13	331	30.3	54	331	30.3	95	332	30.4
14	331	30.3	55	331	30.2	96	332	30.4
15	331	30.3	56	331	30.2	97	332	30.4
16	331	30.1	57	331	30.2	98	332	30.4
17	331	30.1	58	331	30.2	99	332	30.4
18	331	30.1	59	331	30.2	100	332	30.4
19	331	30	60	331	30.2	101	332	30.4
20	331	30	61	331	30.2	102	332	30.4
21	331	30	62	331	30.2	103	332	30.4
22	331	30	63	331	30.2	104	332	30.4
23	331	30	64	331	30.2	105	332	30.4
24	331	30	65	331	30.2	106	332	30.4
25	331	30	66	331	30.3	107	332	30.4
26	331	30	67	331	30.2	108	332	30.5
27	332	30	68	331	30.2	109	332	30.5
28	332	30	69	331	30.2	110	332	30.5
29	332	30	70	331	30.2	111	332	30.4
30	332	30.1	71	331	30.2	112	332	30.4
31	332	30.1	72	331	30.2	113	332	30.5
32	332	30.1	73	331	30.3	114	332	30.5
33	332	30.1	74	331	30.3	115	332	30.6
34	332	30.1	75	331	30.3	116	332	30.7
35	332	30.1	76	331	30.3	117	332	30.8
36	332	30.2	77	331	30.3	118	332	30.8
37	332	30.2	78	331	30.3	119	332	30.9
38	332	30.2	79	331	30.3	120	332	30.9
39	332	30.2	80	331	30.3	81	331	30.3

A.4.4 I.P.: 650 psi, I.T.: 16.6 sec

Time	P	T	40	345	30.4	81	344	30.2
0	650	30.9	41	345	30.4	82	344	30.1
1	517	31.9	42	345	30.3	83	344	30.1
2	404	31.6	43	345	30.4	84	344	30.1
3	373	31.4	44	345	30.4	85	344	30.1
4	361	31.3	45	345	30.4	86	343	30.1
5	355	31.3	46	345	30.4	87	343	30.1
6	352	31.2	47	345	30.4	88	343	30.1
7	350	31.1	48	345	30.4	89	343	30.1
8	348	31	49	345	30.4	90	343	30.1
9	347	30.9	50	345	30.4	91	343	30.1
10	347	30.9	51	345	30.5	92	343	30.1
11	346	30.8	52	345	30.4	93	343	30.1
12	345	30.8	53	345	30.4	94	343	30.1
13	345	30.8	54	345	30.4	95	343	30.1
14	345	30.8	55	345	30.4	96	343	30
15	345	30.7	56	345	30.4	97	343	30
16	344	30.7	57	345	30.4	98	343	30
17	344	30.6	58	345	30.3	99	343	30
18	344	30.5	59	345	30.3	100	343	30
19	344	30.4	60	345	30.3	101	343	30
20	344	30.4	61	345	30.4	102	343	29.9
21	344	30.4	62	345	30.4	103	342	29.9
22	344	30.3	63	345	30.3	104	342	29.9
23	344	30.3	64	345	30.3	105	342	29.9
24	343	30.3	65	345	30.3	106	342	29.9
25	343	30.2	66	344	30.4	107	342	29.9
26	343	30.2	67	344	30.3	108	342	29.9
27	343	30.2	68	344	30.3	109	342	29.8
28	343	30.2	69	344	30.3	110	342	29.8
29	344	30.2	70	344	30.3	111	342	29.8
30	344	30.3	71	344	30.3	112	342	29.8
31	344	30.3	72	344	30.2	113	342	29.8
32	344	30.3	73	344	30.2	114	342	29.8
33	344	30.4	74	344	30.2	115	342	29.8
34	344	30.3	75	344	30.2	116	342	29.8
35	344	30.3	76	344	30.2	117	342	29.7
36	344	30.4	77	344	30.2	118	342	29.7
37	344	30.4	78	344	30.2	119	342	29.7
38	344	30.4	79	344	30.2	120	341	29.7
39	345	30.4	80	344	30.2			

A.4.5 I.P.: 675 psi, I.T.: 24.5 sec

A.4.6 I.P.: 700 psi, I.T.: 22.4 sec

Time	P	T	40	359	30	81	359	30.2	Time	P	T	40	390	29.8	81	387	30.3
0	675	30.6	41	359	30	82	359	30.2	0	700	30.2	41	391	29.8	82	387	30.2
1	529	32	42	359	30	83	359	30.2	1	552	32.2	42	391	29.9	83	386	30.2
2	479	31.9	43	359	30.1	84	358	30.2	2	506	32.3	43	392	29.9	84	386	30.1
3	417	31.6	44	359	30	85	359	30.2	3	473	32.2	44	392	30	85	386	30.1
4	391	31.7	45	359	30.1	86	358	30.1	4	451	32	45	393	30	86	385	30
5	380	31.5	46	359	30.1	87	358	30.2	5	435	31.6	46	393	30.1	87	385	30
6	374	31.4	47	359	30.1	88	358	30.2	6	422	31.4	47	393	30.2	88	385	29.9
7	370	31.3	48	359	30.1	89	358	30.2	7	411	31.3	48	394	30.2	89	385	29.9
8	368	31.2	49	359	30.1	90	358	30.2	8	404	31.1	49	394	30.2	90	385	29.8
9	366	31.1	50	359	30.1	91	358	30.2	9	399	31	50	394	30.3	91	384	29.8
10	365	31	51	359	30.1	92	358	30.2	10	396	30.9	51	395	30.4	92	384	29.7
11	364	30.9	52	359	30.1	93	358	30.2	11	394	30.8	52	395	30.4	93	384	29.7
12	363	30.8	53	359	30.1	94	358	30.2	12	392	30.6	53	395	30.5	94	384	29.6
13	362	30.8	54	359	30.1	95	358	30.2	13	391	30.5	54	394	30.5	95	384	29.6
14	362	30.7	55	359	30.1	96	358	30.2	14	391	30.4	55	394	30.5	96	384	29.6
15	361	30.7	56	359	30.1	97	358	30.2	15	390	30.3	56	394	30.5	97	384	29.5
16	361	30.7	57	359	30.1	98	358	30.2	16	390	30.3	57	394	30.5	98	384	29.4
17	361	30.7	58	359	30.1	99	358	30.2	17	390	30.2	58	394	30.4	99	384	29.5
18	360	30.6	59	359	30.1	100	358	30.2	18	390	30.1	59	394	30.4	100	384	29.4
19	360	30.5	60	359	30.1	101	358	30.2	19	390	30.1	60	394	30.4	101	384	29.4
20	360	30.6	61	359	30.1	102	358	30.2	20	390	30.1	61	394	30.4	102	384	29.4
21	360	30.5	62	359	30.1	103	358	30.2	21	390	30.1	62	393	30.4	103	384	29.4
22	359	30.6	63	359	30.1	104	358	30.2	22	390	30	63	393	30.4	104	384	29.3
23	359	30.5	64	359	30.2	105	358	30.2	23	390	30	64	392	30.4	105	384	29.3
24	359	30.4	65	359	30.2	106	358	30.2	24	390	30	65	392	30.4	106	384	29.3
25	359	30.4	66	359	30.2	107	358	30.2	25	390	29.9	66	392	30.4	107	384	29.3
26	359	30.3	67	359	30.1	108	358	30.2	26	390	30	67	391	30.3	108	384	29.3
27	359	30.3	68	359	30.1	109	358	30.2	27	390	29.9	68	391	30.4	109	385	29.3
28	359	30.3	69	359	30.1	110	358	30.2	28	390	29.9	69	391	30.4	110	385	29.3
29	359	30.3	70	359	30.1	111	358	30.2	29	390	29.9	70	390	30.4	111	385	29.3
30	358	30.3	71	359	30.1	112	358	30.2	30	390	29.9	71	390	30.4	112	386	29.3
31	358	30.2	72	359	30.2	113	358	30.2	31	390	29.9	72	390	30.5	113	386	29.3
32	358	30.2	73	359	30.2	114	358	30.2	32	390	29.9	73	390	30.5	114	387	29.4
33	358	30.2	74	359	30.2	115	358	30.2	33	390	29.8	74	390	30.5	115	389	29.5
34	358	30.2	75	359	30.1	116	358	30.1	34	390	29.8	75	389	30.5	116	391	29.6
35	358	30.1	76	359	30.1	117	358	30.1	35	390	29.8	76	389	30.5	117	392	29.8
36	358	30.1	77	359	30.2	118	358	30.2	36	390	29.8	77	388	30.5	118	393	30
37	358	30.1	78	359	30.2	119	358	30.2	37	390	29.7	78	388	30.4	119	393	30
38	358	30.1	79	359	30.2	120	358	30.2	38	389	29.7	79	387	30.3	120	394	30.1
39	358	30.1	80	359	30.2	81	359	30.2	39	390	29.7	80	387	30.3			

A.4.7 I.P.: 725 psi, I.T.: 18.0 sec

Time	P	T	40	395	30.3	81	394	30.1
0	725	30.5	41	395	30.3	82	394	30.1
1	562	32.5	42	395	30.3	83	394	30.1
2	510	32.4	43	395	30.3	84	394	30.1
3	479	32.2	44	395	30.3	85	394	30.1
4	457	32	45	395	30.3	86	394	30.1
5	440	31.7	46	395	30.3	87	394	30.1
6	425	31.6	47	395	30.3	88	394	30
7	415	31.4	48	395	30.3	89	394	30
8	410	31.3	49	395	30.3	90	394	30
9	406	31.2	50	395	30.2	91	394	30
10	404	31.1	51	395	30.2	92	394	30
11	402	31.1	52	395	30.3	93	393	30
12	400	31	53	395	30.3	94	393	30
13	400	30.9	54	395	30.3	95	393	30
14	399	30.9	55	395	30.3	96	393	29.9
15	398	30.7	56	395	30.2	97	393	29.9
16	398	30.7	57	395	30.3	98	393	29.9
17	397	30.6	58	395	30.3	99	393	29.9
18	396	30.6	59	395	30.2	100	393	29.9
19	396	30.5	60	395	30.3	101	393	29.9
20	395	30.5	61	395	30.3	102	393	29.9
21	395	30.5	62	395	30.2	103	393	29.9
22	395	30.4	63	395	30.2	104	393	29.9
23	394	30.4	64	395	30.2	105	393	29.9
24	394	30.3	65	395	30.2	106	393	29.9
25	394	30.3	66	395	30.2	107	393	29.9
26	394	30.3	67	395	30.2	108	393	29.8
27	394	30.3	68	395	30.2	109	393	29.8
28	394	30.3	69	395	30.1	110	393	29.8
29	394	30.3	70	395	30.1	111	392	29.8
30	394	30.3	71	394	30.2	112	392	29.8
31	394	30.3	72	394	30.2	113	392	29.8
32	394	30.3	73	394	30.2	114	392	29.8
33	394	30.3	74	394	30.1	115	392	29.8
34	395	30.3	75	394	30.1	116	392	29.8
35	395	30.3	76	394	30.1	117	392	29.8
36	395	30.3	77	394	30.1	118	392	29.8
37	395	30.3	78	394	30.1	119	392	29.8
38	395	30.2	79	394	30.1	120	392	29.8
39	395	30.3	80	394	30.1	81	394	30.1

A.4.8 I.P.: 750 psi, I.T.: 21.1 sec

Time	P	T	40	411	30.3	81	409	30.4
0	750	30.7	41	411	30.3	82	409	30.4
1	578	32	42	411	30.3	83	409	30.4
2	520	32.5	43	410	30.3	84	409	30.4
3	489	32.3	44	410	30.3	85	409	30.4
4	469	32	45	410	30.3	86	409	30.5
5	455	31.8	46	410	30.3	87	409	30.5
6	445	31.6	47	410	30.3	88	409	30.5
7	437	31.4	48	410	30.3	89	409	30.5
8	430	31.3	49	410	30.3	90	409	30.5
9	425	31.1	50	410	30.3	91	409	30.5
10	421	31	51	410	30.3	92	409	30.5
11	417	30.8	52	410	30.3	93	409	30.5
12	416	30.7	53	410	30.3	94	409	30.5
13	415	30.7	54	410	30.3	95	409	30.5
14	414	30.7	55	410	30.3	96	409	30.5
15	414	30.6	56	410	30.3	97	409	30.5
16	413	30.5	57	410	30.3	98	409	30.5
17	413	30.5	58	410	30.3	99	409	30.6
18	412	30.4	59	410	30.4	100	409	30.6
19	412	30.4	60	410	30.4	101	408	30.6
20	412	30.3	61	410	30.3	102	408	30.7
21	412	30.2	62	410	30.3	103	408	30.7
22	412	30.2	63	410	30.3	104	408	30.7
23	412	30.2	64	410	30.3	105	408	30.7
24	412	30.2	65	409	30.3	106	408	30.8
25	412	30.2	66	409	30.3	107	408	30.8
26	412	30.2	67	409	30.3	108	408	30.8
27	412	30.2	68	409	30.3	109	408	30.8
28	412	30.2	69	409	30.4	110	408	30.9
29	412	30.3	70	409	30.4	111	408	30.9
30	412	30.3	71	409	30.4	112	408	30.9
31	411	30.3	72	409	30.4	113	408	30.9
32	411	30.3	73	409	30.4	114	408	31
33	411	30.3	74	409	30.4	115	408	31
34	411	30.3	75	409	30.4	116	408	30.9
35	411	30.3	76	410	30.4	117	408	31
36	411	30.3	77	409	30.4	118	408	31
37	411	30.3	78	409	30.4	119	408	31
38	411	30.2	79	409	30.4	120	408	31
39	411	30.3	80	409	30.4			

A.4.9 I.P.: 800 psi, I.T.: 30.2 sec

Time	P	T	40	458	30.5	81	455	30.6
0	800	30.9	41	458	30.4	82	455	30.6
1	620	33.4	42	458	30.4	83	454	30.6
2	566	33.9	43	458	30.4	84	454	30.6
3	531	33.5	44	459	30.5	85	454	30.5
4	512	33.1	45	459	30.5	86	453	30.5
5	498	32.7	46	459	30.5	87	453	30.4
6	488	32.4	47	459	30.5	88	453	30.4
7	481	32.1	48	459	30.5	89	452	30.3
8	475	31.8	49	459	30.5	90	452	30.3
9	471	31.7	50	459	30.5	91	452	30.2
10	467	31.5	51	459	30.5	92	452	30.2
11	465	31.3	52	459	30.5	93	451	30.2
12	463	31.2	53	459	30.5	94	451	30.2
13	461	31	54	459	30.5	95	451	30.2
14	460	31	55	459	30.5	96	451	30.2
15	458	30.8	56	459	30.5	97	451	30.2
16	457	30.7	57	459	30.5	98	451	30.1
17	457	30.6	58	459	30.5	99	451	30.1
18	457	30.6	59	459	30.5	100	451	30.1
19	457	30.6	60	459	30.5	101	450	30.1
20	457	30.5	61	459	30.5	102	450	30
21	457	30.5	62	459	30.5	103	450	30
22	457	30.5	63	459	30.6	104	450	30
23	456	30.4	64	459	30.6	105	450	30
24	457	30.4	65	459	30.6	106	450	30
25	456	30.4	66	459	30.6	107	450	30
26	456	30.3	67	459	30.6	108	450	30
27	457	30.3	68	459	30.6	109	450	30
28	457	30.3	69	458	30.6	110	450	30
29	457	30.3	70	458	30.6	111	450	30
30	457	30.3	71	458	30.6	112	450	29.9
31	457	30.3	72	457	30.6	113	450	29.9
32	457	30.3	73	457	30.6	114	451	29.8
33	457	30.4	74	457	30.5	115	451	29.8
34	458	30.3	75	457	30.4	116	451	29.7
35	458	30.4	76	456	30.5	117	451	29.7
36	458	30.3	77	456	30.5	118	451	29.7
37	458	30.3	78	456	30.5	119	452	29.6
38	458	30.4	79	456	30.6	120	453	29.7
39	458	30.4	80	455	30.6			

A.4.10 I.P.: 900 psi, I.T.: 24.7 sec

Time	P	T	40	541	30.6	81	533	29.8
0	900	31.3	41	541	30.6	82	533	29.9
1	692	34.5	42	541	30.7	83	533	29.8
2	631	34.9	43	541	30.7	84	533	29.9
3	599	34.4	44	540	30.7	85	533	29.9
4	580	33.6	45	539	30.6	86	533	29.9
5	568	32.9	46	539	30.6	87	534	29.9
6	560	32.4	47	539	30.6	88	534	29.9
7	555	32	48	537	30.6	89	534	29.9
8	551	31.7	49	536	30.6	90	534	29.9
9	547	31.5	50	535	30.6	91	534	29.9
10	545	31.3	51	535	30.5	92	534	29.9
11	543	31.2	52	534	30.5	93	534	29.9
12	541	31.1	53	534	30.5	94	534	29.9
13	540	31	54	533	30.4	95	534	29.9
14	539	30.8	55	533	30.4	96	534	29.9
15	538	30.8	56	533	30.3	97	534	29.9
16	537	30.7	57	532	30.3	98	534	29.9
17	538	30.7	58	532	30.3	99	534	29.9
18	538	30.7	59	532	30.3	100	534	29.9
19	538	30.7	60	532	30.3	101	534	29.9
20	538	30.7	61	531	30.3	102	534	29.9
21	539	30.6	62	531	30.3	103	534	29.9
22	539	30.7	63	531	30.2	104	534	29.9
23	539	30.7	64	531	30.2	105	534	29.9
24	540	30.6	65	531	30.2	106	534	29.9
25	540	30.7	66	531	30.2	107	534	29.9
26	540	30.6	67	531	30.2	108	534	29.9
27	540	30.6	68	531	30.2	109	534	29.9
28	540	30.6	69	531	30.2	110	534	29.9
29	540	30.6	70	532	30.1	111	534	29.9
30	540	30.6	71	532	30.1	112	534	29.9
31	541	30.6	72	532	30.1	113	534	29.9
32	541	30.6	73	532	30	114	534	29.9
33	541	30.6	74	532	30	115	534	29.9
34	541	30.6	75	532	30	116	534	29.9
35	541	30.6	76	533	30	117	534	29.9
36	541	30.6	77	533	29.9	118	534	29.9
37	541	30.6	78	533	29.9	119	534	29.9
38	541	30.6	79	533	29.9	120	534	29.9
39	541	30.6	80	533	29.8			

A.5 n-pentane at 30 degree of Celsius (Experiment 2)

A.5.1 I.P.: 500 psi, I.T.: 20.2 sec

A.5.2 I.P.: 600 psi, I.T.: 19.4 sec

Time	P	T	40	292	30.1	81	291	30.3	Time	P	T	40	319	30.6	81	315	30
0	500	31	41	292	30.2	82	290	30.3	0	600	30.6	41	319	30.6	82	315	30
1	335	31.4	42	293	30.3	83	290	30.3	1	447	31.7	42	319	30.6	83	315	29.9
2	313	31.6	43	293	30.3	84	290	30.2	2	353	31.5	43	319	30.6	84	315	29.9
3	303	31.4	44	293	30.3	85	290	30.2	3	337	31.3	44	319	30.6	85	315	29.9
4	300	31.4	45	293	30.4	86	290	30.2	4	330	31.3	45	319	30.6	86	315	29.9
5	298	31.3	46	293	30.4	87	290	30.2	5	327	31.3	46	319	30.6	87	315	29.9
6	297	31.1	47	293	30.5	88	290	30.2	6	324	31.3	47	319	30.6	88	315	29.9
7	296	31	48	293	30.5	89	290	30.1	7	323	31.3	48	319	30.6	89	315	29.9
8	295	30.9	49	293	30.5	90	290	30.1	8	322	31.2	49	319	30.6	90	315	29.9
9	294	30.8	50	293	30.5	91	290	30.1	9	321	31.2	50	319	30.6	91	315	29.9
10	294	30.8	51	293	30.5	92	290	30.1	10	320	31.1	51	319	30.6	92	315	29.8
11	293	30.7	52	293	30.6	93	290	30.1	11	319	31.1	52	319	30.6	93	315	29.8
12	293	30.6	53	293	30.6	94	290	30.1	12	319	31	53	319	30.6	94	315	29.8
13	293	30.6	54	293	30.6	95	290	30.1	13	318	30.9	54	319	30.6	95	315	29.8
14	292	30.5	55	293	30.6	96	289	30	14	318	30.8	55	319	30.6	96	315	29.8
15	292	30.4	56	293	30.6	97	289	30	15	318	30.9	56	319	30.6	97	315	29.8
16	292	30.3	57	293	30.6	98	289	30	16	318	30.8	57	319	30.6	98	315	29.8
17	292	30.3	58	293	30.6	99	289	30	17	318	30.8	58	319	30.6	99	315	29.8
18	292	30.2	59	293	30.6	100	289	29.9	18	318	30.7	59	319	30.6	100	315	29.8
19	292	30.2	60	293	30.6	101	289	29.9	19	318	30.6	60	319	30.6	101	314	29.8
20	292	30.2	61	293	30.6	102	289	29.9	20	318	30.6	61	319	30.6	102	314	29.8
21	291	30.1	62	293	30.6	103	289	29.9	21	318	30.6	62	319	30.6	103	315	29.8
22	291	30.1	63	292	30.6	104	289	29.9	22	318	30.6	63	319	30.6	104	314	29.8
23	291	30.1	64	292	30.6	105	289	29.9	23	318	30.6	64	319	30.6	105	314	29.8
24	291	30.1	65	292	30.5	106	289	29.9	24	318	30.5	65	318	30.6	106	314	29.8
25	291	30	66	292	30.5	107	289	29.8	25	318	30.5	66	317	30.5	107	314	29.8
26	291	30	67	292	30.5	108	289	29.8	26	318	30.5	67	316	30.5	108	314	29.7
27	291	30	68	292	30.5	109	289	29.8	27	319	30.5	68	316	30.4	109	314	29.7
28	291	30	69	292	30.5	110	289	29.8	28	319	30.5	69	316	30.4	110	314	29.7
29	291	29.9	70	292	30.5	111	289	29.8	29	319	30.5	70	315	30.3	111	314	29.7
30	291	29.9	71	292	30.5	112	289	29.8	30	319	30.6	71	315	30.4	112	314	29.7
31	291	30	72	291	30.5	113	289	29.8	31	319	30.6	72	315	30.3	113	314	29.7
32	291	29.9	73	291	30.5	114	289	29.8	32	319	30.6	73	315	30.3	114	314	29.7
33	291	29.9	74	291	30.5	115	288	29.7	33	319	30.6	74	315	30.2	115	314	29.7
34	292	30	75	291	30.4	116	288	29.7	34	319	30.6	75	315	30.3	116	314	29.7
35	292	30	76	291	30.4	117	288	29.7	35	319	30.6	76	315	30.2	117	315	29.7
36	292	30	77	291	30.4	118	288	29.7	36	319	30.6	77	315	30.2	118	316	29.8
37	292	30	78	291	30.4	119	288	29.7	37	319	30.6	78	315	30.1	119	318	29.9
38	292	30.1	79	291	30.3	120	288	29.7	38	319	30.6	79	315	30.1	120	319	30.1
39	292	30.1	80	291	30.3				39	319	30.6	80	315	30			

A.5.3 I.P.: 650 psi, I.T.: 22.4 sec

A.5.4 I.P.: 685 psi, I.T.: 11.7 sec

Time	P	T	40	355	30.1	81	356	30.3	Time	P	T	40	352	30.2	81	353	30.4
0	650	30.5	41	355	30.1	82	356	30.3	0	685	30.8	41	352	30.2	82	353	30.4
1	527	32.1	42	355	30.1	83	356	30.3	1	530	32	42	352	30.2	83	353	30.4
2	463	32.1	43	355	30.1	84	356	30.2	2	441	32	43	352	30.2	84	353	30.4
3	401	31.9	44	355	30.1	85	356	30.3	3	392	31.9	44	352	30.2	85	353	30.4
4	380	31.8	45	356	30.1	86	356	30.3	4	375	32	45	353	30.2	86	353	30.4
5	371	31.6	46	356	30.1	87	356	30.2	5	368	31.8	46	353	30.2	87	353	30.4
6	366	31.4	47	356	30.1	88	356	30.2	6	364	31.8	47	353	30.2	88	353	30.4
7	363	31.3	48	356	30.2	89	356	30.2	7	361	31.6	48	353	30.2	89	353	30.4
8	361	31.2	49	356	30.2	90	356	30.2	8	360	31.6	49	353	30.3	90	353	30.4
9	360	31.1	50	356	30.2	91	356	30.2	9	358	31.5	50	353	30.3	91	353	30.4
10	359	31	51	356	30.2	92	356	30.2	10	357	31.4	51	353	30.3	92	353	30.4
11	358	30.9	52	356	30.2	93	356	30.2	11	355	31.4	52	353	30.3	93	353	30.4
12	357	30.9	53	356	30.2	94	356	30.2	12	355	31.2	53	353	30.3	94	353	30.4
13	357	30.8	54	356	30.2	95	356	30.2	13	354	31.1	54	353	30.3	95	353	30.4
14	356	30.7	55	356	30.2	96	356	30.2	14	353	31	55	353	30.4	96	353	30.4
15	356	30.6	56	356	30.2	97	356	30.2	15	353	30.9	56	353	30.3	97	352	30.4
16	355	30.6	57	356	30.3	98	356	30.2	16	352	30.7	57	353	30.3	98	352	30.4
17	355	30.5	58	356	30.2	99	356	30.2	17	352	30.7	58	353	30.3	99	352	30.4
18	355	30.4	59	356	30.2	100	356	30.2	18	352	30.6	59	353	30.3	100	352	30.4
19	355	30.4	60	356	30.2	101	356	30.2	19	352	30.6	60	353	30.3	101	352	30.4
20	355	30.4	61	356	30.2	102	356	30.2	20	352	30.6	61	353	30.3	102	352	30.4
21	355	30.4	62	356	30.2	103	356	30.2	21	352	30.6	62	353	30.3	103	352	30.4
22	355	30.3	63	356	30.2	104	356	30.2	22	352	30.5	63	353	30.3	104	352	30.4
23	355	30.3	64	356	30.2	105	356	30.2	23	352	30.4	64	353	30.3	105	352	30.4
24	355	30.2	65	356	30.2	106	356	30.2	24	352	30.4	65	353	30.4	106	352	30.4
25	355	30.2	66	356	30.2	107	356	30.2	25	352	30.4	66	353	30.4	107	352	30.3
26	355	30.1	67	356	30.2	108	356	30.2	26	352	30.3	67	353	30.4	108	352	30.3
27	355	30.1	68	356	30.2	109	356	30.2	27	352	30.3	68	353	30.4	109	352	30.3
28	355	30.1	69	356	30.2	110	356	30.2	28	352	30.2	69	353	30.4	110	352	30.3
29	355	30.1	70	356	30.2	111	356	30.2	29	352	30.2	70	353	30.4	111	352	30.3
30	355	30.1	71	356	30.2	112	355	30.2	30	351	30.2	71	353	30.4	112	352	30.3
31	355	30.1	72	356	30.2	113	355	30.2	31	352	30.2	72	353	30.4	113	352	30.3
32	355	30	73	356	30.2	114	355	30.2	32	351	30.2	73	353	30.4	114	352	30.3
33	355	30	74	356	30.3	115	356	30.2	33	352	30.2	74	353	30.4	115	352	30.3
34	355	30	75	356	30.3	116	355	30.2	34	352	30.2	75	353	30.4	116	352	30.3
35	355	30	76	356	30.3	117	355	30.2	35	352	30.2	76	353	30.4	117	352	30.3
36	355	30	77	356	30.3	118	355	30.2	36	352	30.2	77	353	30.4	118	352	30.3
37	355	30	78	356	30.3	119	355	30.2	37	352	30.2	78	353	30.4	119	352	30.3
38	355	30.1	79	356	30.3	120	355	30.2	38	352	30.2	79	353	30.4	120	352	30.3
39	355	30.1	80	356	30.2				39	352	30.2	80	353	30.4			

A.5.5 I.P.: 700 psi, I.T.: 17.0 sec

Time	P	T	40	381	30.2	81	379	30.2
0	700	30.8	41	381	30.2	82	379	30.2
1	552	32.1	42	381	30.2	83	379	30.2
2	494	32.1	43	381	30.2	84	379	30.1
3	463	32.1	44	381	30.3	85	379	30.1
4	428	32	45	381	30.3	86	379	30.1
5	408	31.7	46	380	30.2	87	379	30.1
6	397	31.4	47	380	30.2	88	380	30.1
7	391	31.2	48	380	30.2	89	381	30.1
8	387	31.1	49	380	30.2	90	381	30.3
9	385	30.9	50	380	30.2	91	383	30.5
10	383	30.9	51	380	30.2	92	384	30.6
11	382	30.7	52	380	30.2	93	384	30.7
12	382	30.7	53	380	30.2	94	385	30.7
13	381	30.7	54	380	30.3	95	385	30.8
14	381	30.6	55	380	30.3	96	386	30.9
15	381	30.6	56	380	30.3	97	386	30.9
16	381	30.5	57	380	30.3	98	386	31
17	380	30.5	58	380	30.3	99	386	31
18	380	30.4	59	380	30.3	100	386	31
19	380	30.3	60	380	30.3	101	385	31
20	380	30.3	61	380	30.2	102	385	31
21	380	30.3	62	380	30.2	103	385	31
22	380	30.2	63	380	30.2	104	385	31
23	380	30.2	64	380	30.2	105	384	31
24	380	30.2	65	380	30.2	106	384	30.9
25	380	30.2	66	380	30.2	107	384	30.9
26	380	30.3	67	380	30.2	108	384	30.9
27	380	30.2	68	380	30.2	109	384	30.9
28	380	30.2	69	380	30.2	110	384	30.9
29	380	30.3	70	380	30.2	111	384	30.9
30	381	30.2	71	380	30.2	112	383	30.9
31	381	30.2	72	380	30.2	113	383	30.9
32	381	30.2	73	380	30.2	114	383	30.9
33	381	30.2	74	380	30.2	115	383	30.7
34	381	30.2	75	379	30.2	116	383	30.7
35	381	30.2	76	379	30.2	117	383	30.7
36	381	30.2	77	379	30.2	118	383	30.7
37	381	30.3	78	379	30.2	119	382	30.7
38	381	30.3	79	379	30.2	120	382	30.7
39	381	30.2	80	379	30.2			

A.5.6 I.P.: 750 psi, I.T.: 18.8 sec

Time	P	T	40	407	30.3	81	407	30.4
0	750	31.1	41	407	30.3	82	407	30.4
1	579	32.6	42	407	30.3	83	407	30.4
2	518	33	43	407	30.3	84	407	30.4
3	486	32.9	44	407	30.3	85	407	30.4
4	466	32.5	45	407	30.3	86	407	30.4
5	453	32.2	46	407	30.3	87	407	30.4
6	442	32	47	407	30.3	88	407	30.4
7	434	31.7	48	407	30.3	89	407	30.4
8	427	31.5	49	407	30.3	90	407	30.4
9	422	31.3	50	407	30.3	91	407	30.4
10	417	31.1	51	407	30.3	92	407	30.4
11	414	31	52	407	30.3	93	407	30.4
12	412	30.9	53	407	30.4	94	407	30.4
13	410	30.7	54	407	30.4	95	407	30.4
14	409	30.6	55	407	30.4	96	407	30.4
15	409	30.6	56	407	30.4	97	407	30.4
16	409	30.6	57	408	30.4	98	407	30.4
17	409	30.6	58	407	30.4	99	407	30.4
18	408	30.5	59	407	30.4	100	407	30.4
19	408	30.5	60	407	30.4	101	406	30.4
20	408	30.5	61	407	30.4	102	406	30.4
21	408	30.4	62	408	30.4	103	406	30.4
22	408	30.4	63	408	30.4	104	406	30.4
23	407	30.4	64	408	30.4	105	406	30.4
24	407	30.3	65	407	30.4	106	406	30.4
25	407	30.3	66	408	30.4	107	406	30.3
26	407	30.3	67	408	30.4	108	406	30.3
27	407	30.3	68	408	30.4	109	406	30.3
28	407	30.2	69	407	30.4	110	406	30.3
29	407	30.3	70	408	30.4	111	406	30.3
30	407	30.3	71	407	30.4	112	406	30.3
31	406	30.3	72	408	30.5	113	406	30.3
32	407	30.3	73	408	30.5	114	406	30.4
33	407	30.2	74	407	30.5	115	406	30.4
34	407	30.2	75	407	30.5	116	406	30.4
35	407	30.2	76	407	30.4	117	406	30.4
36	407	30.2	77	407	30.4	118	406	30.4
37	407	30.2	78	407	30.4	119	406	30.4
38	407	30.3	79	407	30.4	120	406	30.4
39	407	30.3	80	407	30.4			

A.6 n-heptane at 30 degree of Celsius (Experiment 1)

A.6.1 I.P.: 500 psi, I.T.: 21.1 sec

A.6.2 I.P.: 600 psi, I.T.: 17.4 sec

Time	P	T	40	269	30	81	270	30.6	Time	P	T	40	326	30.5	81	325	31.1
0	500	30.9	41	269	30	82	270	30.6	0	600	30.4	41	326	30.6	82	325	31.1
1	427	32	42	269	30	83	270	30.6	1	508	32	42	326	30.6	83	325	31.1
2	386	32	43	269	30	84	270	30.7	2	464	32	43	326	30.6	84	325	31.1
3	353	31.6	44	269	30	85	270	30.7	3	433	31.7	44	326	30.6	85	325	31.1
4	312	31.3	45	269	30.1	86	270	30.7	4	411	31.4	45	326	30.6	86	325	31.1
5	293	30.9	46	269	30.1	87	270	30.7	5	394	31.1	46	326	30.7	87	325	31.1
6	284	30.7	47	269	30.2	88	270	30.7	6	382	30.9	47	326	30.7	88	324	31.2
7	278	30.7	48	269	30.2	89	270	30.7	7	372	30.7	48	326	30.8	89	324	31.1
8	276	30.6	49	269	30.2	90	270	30.7	8	363	30.6	49	326	30.8	90	324	31
9	273	30.4	50	269	30.2	91	270	30.8	9	355	30.5	50	326	30.8	91	323	30.9
10	272	30.4	51	269	30.2	92	270	30.8	10	348	30.4	51	326	30.7	92	323	30.8
11	271	30.2	52	269	30.2	93	270	30.8	11	343	30.4	52	326	30.8	93	323	30.8
12	270	30.2	53	269	30.2	94	269	30.9	12	338	30.3	53	326	30.8	94	323	30.8
13	270	30.2	54	269	30.2	95	269	30.9	13	335	30.3	54	325	30.8	95	323	30.7
14	269	30.1	55	269	30.2	96	269	30.8	14	333	30.3	55	325	30.8	96	323	30.6
15	269	30.1	56	269	30.3	97	269	30.8	15	332	30.2	56	325	30.8	97	323	30.6
16	268	30	57	269	30.3	98	268	30.7	16	331	30.1	57	325	30.8	98	323	30.6
17	268	30.1	58	269	30.3	99	268	30.7	17	330	30.2	58	325	30.8	99	322	30.4
18	268	30.1	59	269	30.3	100	268	30.6	18	329	30.1	59	325	30.8	100	322	30.4
19	268	30	60	269	30.3	101	268	30.6	19	329	30.1	60	325	30.8	101	322	30.4
20	268	30	61	269	30.3	102	268	30.5	20	329	30.2	61	325	30.8	102	322	30.3
21	268	29.9	62	269	30.4	103	268	30.5	21	328	30.1	62	325	30.8	103	322	30.3
22	268	29.9	63	269	30.4	104	268	30.5	22	328	30.1	63	325	30.8	104	322	30.2
23	268	29.8	64	269	30.4	105	268	30.4	23	328	30.1	64	325	30.9	105	322	30.2
24	268	29.8	65	269	30.4	106	268	30.4	24	327	30.2	65	325	30.9	106	322	30.2
25	268	29.8	66	269	30.5	107	268	30.4	25	327	30.2	66	325	30.9	107	322	30.1
26	268	29.8	67	270	30.5	108	268	30.3	26	327	30.2	67	325	30.8	108	322	30.1
27	268	29.7	68	270	30.5	109	268	30.3	27	327	30.3	68	325	30.9	109	322	30.1
28	268	29.8	69	270	30.4	110	268	30.3	28	327	30.3	69	325	30.9	110	321	30.1
29	268	29.8	70	270	30.4	111	268	30.3	29	327	30.3	70	325	30.9	111	321	30
30	268	29.7	71	270	30.5	112	268	30.3	30	327	30.3	71	325	31	112	321	30
31	268	29.8	72	270	30.5	113	268	30.3	31	327	30.4	72	325	31	113	321	30
32	268	29.8	73	270	30.5	114	268	30.3	32	327	30.4	73	325	30.9	114	321	29.9
33	268	29.8	74	270	30.5	115	268	30.3	33	327	30.4	74	325	30.9	115	321	29.9
34	268	29.8	75	270	30.5	116	268	30.3	34	326	30.4	75	325	30.9	116	321	29.9
35	268	29.8	76	270	30.5	117	268	30.3	35	326	30.4	76	325	31	117	321	29.9
36	269	29.9	77	270	30.5	118	268	30.3	36	326	30.4	77	325	31	118	321	29.9
37	269	30	78	270	30.6	119	268	30.3	37	326	30.5	78	325	31	119	321	29.8
38	269	29.9	79	270	30.6	120	268	30.3	38	326	30.5	79	325	31	120	321	29.9
39	269	29.9	80	270	30.6				39	326	30.5	80	325	31.1			

A.6.3 I.P.: 650 psi, I.T.: 21.0 sec

Time	P	T	40	349	30.4	81	345	30.3
0	650	30.9	41	349	30.5	82	345	30.3
1	540	32.3	42	348	30.5	83	345	30.3
2	489	32.2	43	348	30.5	84	345	30.3
3	459	31.9	44	348	30.5	85	345	30.3
4	439	31.6	45	348	30.5	86	345	30.3
5	423	31.5	46	348	30.5	87	345	30.3
6	409	31.4	47	348	30.5	88	345	30.3
7	399	31.3	48	347	30.5	89	345	30.3
8	390	31.1	49	347	30.5	90	345	30.3
9	382	31	50	347	30.5	91	345	30.3
10	376	30.9	51	347	30.4	92	345	30.3
11	370	30.7	52	347	30.4	93	345	30.3
12	366	30.6	53	347	30.4	94	345	30.3
13	363	30.6	54	346	30.4	95	345	30.3
14	360	30.5	55	346	30.4	96	345	30.3
15	358	30.4	56	346	30.3	97	345	30.3
16	357	30.4	57	346	30.3	98	345	30.3
17	356	30.4	58	346	30.3	99	345	30.3
18	354	30.3	59	346	30.3	100	345	30.3
19	354	30.3	60	346	30.3	101	345	30.3
20	353	30.2	61	345	30.2	102	345	30.3
21	352	30.2	62	345	30.3	103	345	30.3
22	352	30.2	63	345	30.3	104	345	30.3
23	351	30.2	64	345	30.3	105	345	30.3
24	351	30.2	65	345	30.3	106	345	30.3
25	351	30.2	66	345	30.3	107	345	30.3
26	351	30.2	67	345	30.3	108	345	30.3
27	350	30.2	68	345	30.3	109	345	30.2
28	350	30.2	69	345	30.3	110	345	30.2
29	350	30.3	70	345	30.3	111	345	30.2
30	350	30.3	71	345	30.3	112	345	30.2
31	350	30.3	72	345	30.3	113	345	30.2
32	350	30.3	73	345	30.3	114	345	30.2
33	349	30.3	74	345	30.3	115	345	30.2
34	349	30.3	75	345	30.3	116	345	30.2
35	349	30.3	76	345	30.3	117	345	30.2
36	349	30.3	77	345	30.3	118	345	30.2
37	349	30.4	78	345	30.3	119	345	30.2
38	349	30.4	79	345	30.3	120	345	30.2
39	349	30.4	80	345	30.3			

A.6.4 I.P.: 700 psi, I.T.: 18.4 sec

Time	P	T	40	385	30.1	81	383	30
0	700	30.3	41	385	30.1	82	383	30.1
1	579	31.8	42	385	30.1	83	383	30.1
2	524	31.8	43	385	30.1	84	383	30.1
3	492	31.4	44	385	30.1	85	383	30.1
4	470	31.2	45	385	30.1	86	383	30.1
5	454	31	46	385	30.1	87	383	30.1
6	441	30.9	47	385	30	88	383	30
7	430	30.8	48	385	30	89	383	30
8	422	30.8	49	384	30	90	383	30.1
9	416	30.7	50	384	30.1	91	383	30.1
10	411	30.6	51	384	30.1	92	383	30.1
11	408	30.5	52	384	30.1	93	383	30.1
12	405	30.5	53	384	30.1	94	383	30
13	403	30.4	54	384	30.1	95	383	30
14	401	30.4	55	384	30.1	96	383	30
15	399	30.4	56	384	30	97	383	30
16	398	30.3	57	384	30	98	383	30
17	396	30.3	58	384	30	99	383	30
18	395	30.3	59	384	30	100	383	30
19	394	30.2	60	384	30	101	383	30
20	393	30.2	61	384	30	102	383	30
21	392	30.2	62	384	30	103	383	30
22	392	30.2	63	383	30	104	383	30
23	391	30.2	64	383	30	105	383	30
24	390	30.2	65	383	30	106	383	30
25	390	30.2	66	383	30.1	107	383	30
26	389	30.2	67	383	30	108	383	30
27	389	30.2	68	383	30	109	383	30
28	389	30.2	69	383	30	110	383	30
29	388	30.2	70	383	30	111	383	30
30	388	30.1	71	383	30	112	383	30
31	387	30.2	72	383	30	113	383	30
32	387	30.1	73	383	30	114	383	30
33	387	30.1	74	383	30	115	383	30
34	387	30.1	75	383	30	116	383	30
35	386	30.1	76	383	30	117	383	30
36	386	30.1	77	383	30	118	383	30
37	386	30.1	78	383	30	119	383	30
38	386	30.1	79	383	30	120	383	30
39	386	30.1	80	383	30			

A.6.5 I.P.: 750 psi, I.T.: 25.7 sec

A.6.6 I.P.: 775 psi, I.T.: 19.6 sec

Time	P	T	40	424	30.2	81	423	30.3	Time	P	T	40	439	29.9	81	438	29.9
0	750	30.6	41	424	30.2	82	423	30.3	0	775	31	41	439	29.9	82	438	29.9
1	616	32.7	42	424	30.2	83	423	30.3	1	634	32.6	42	439	29.9	83	438	29.9
2	562	32.7	43	424	30.2	84	423	30.3	2	571	32.6	43	439	29.9	84	438	29.9
3	524	32.5	44	424	30.2	85	423	30.3	3	534	32.3	44	439	29.9	85	439	29.9
4	499	32.1	45	424	30.2	86	423	30.3	4	510	32	45	439	29.9	86	439	29.9
5	482	31.9	46	424	30.3	87	423	30.3	5	494	31.8	46	439	29.9	87	439	30
6	469	31.8	47	424	30.3	88	423	30.3	6	483	31.6	47	439	29.9	88	439	30
7	460	31.6	48	424	30.3	89	423	30.3	7	474	31.5	48	439	30	89	439	29.9
8	453	31.5	49	424	30.3	90	423	30.3	8	468	31.4	49	439	29.9	90	439	29.9
9	448	31.4	50	424	30.3	91	423	30.3	9	463	31.3	50	439	29.9	91	439	29.9
10	443	31.2	51	424	30.3	92	423	30.3	10	458	31.2	51	438	29.9	92	439	29.9
11	439	31.1	52	424	30.3	93	423	30.3	11	455	31.1	52	438	29.9	93	439	29.9
12	436	31	53	424	30.3	94	423	30.3	12	452	31	53	438	29.9	94	439	29.9
13	434	30.9	54	424	30.3	95	423	30.3	13	450	30.9	54	438	29.9	95	439	29.9
14	432	30.8	55	424	30.3	96	423	30.3	14	448	30.9	55	438	29.9	96	439	29.9
15	430	30.7	56	424	30.3	97	423	30.3	15	446	30.7	56	438	29.9	97	439	30
16	428	30.6	57	424	30.3	98	423	30.2	16	445	30.7	57	438	29.9	98	439	30
17	427	30.5	58	424	30.3	99	423	30.3	17	443	30.6	58	438	29.9	99	439	29.9
18	426	30.5	59	424	30.3	100	423	30.3	18	443	30.6	59	438	29.9	100	439	29.9
19	425	30.4	60	424	30.3	101	423	30.3	19	442	30.5	60	438	29.9	101	439	29.9
20	425	30.4	61	424	30.3	102	423	30.3	20	441	30.5	61	438	29.9	102	439	29.9
21	424	30.4	62	424	30.3	103	423	30.3	21	440	30.4	62	438	29.9	103	439	29.9
22	424	30.4	63	423	30.3	104	423	30.3	22	439	30.4	63	438	29.9	104	439	29.9
23	424	30.3	64	423	30.3	105	423	30.3	23	439	30.4	64	438	29.9	105	439	29.9
24	424	30.2	65	423	30.3	106	423	30.3	24	439	30.3	65	438	29.9	106	439	29.9
25	424	30.2	66	423	30.3	107	423	30.3	25	439	30.3	66	438	29.9	107	439	29.9
26	424	30.2	67	423	30.3	108	423	30.3	26	439	30.3	67	438	29.9	108	439	29.9
27	424	30.2	68	423	30.3	109	423	30.3	27	439	30.2	68	438	29.9	109	439	29.9
28	424	30.2	69	423	30.3	110	423	30.3	28	439	30.2	69	438	29.9	110	439	29.9
29	424	30.2	70	423	30.3	111	423	30.3	29	439	30.2	70	438	29.9	111	439	29.9
30	424	30.2	71	423	30.3	112	423	30.3	30	439	30.1	71	438	29.9	112	439	29.9
31	424	30.2	72	423	30.3	113	423	30.3	31	439	30.1	72	438	29.9	113	439	29.8
32	424	30.2	73	423	30.3	114	423	30.3	32	439	30.1	73	438	29.9	114	439	29.8
33	424	30.2	74	423	30.3	115	423	30.3	33	439	30.1	74	438	29.9	115	439	29.8
34	424	30.2	75	423	30.3	116	422	30.3	34	439	30.1	75	438	29.9	116	439	29.8
35	424	30.2	76	423	30.3	117	422	30.3	35	439	30	76	438	29.9	117	438	29.8
36	424	30.2	77	423	30.3	118	422	30.3	36	439	30	77	438	29.9	118	438	29.8
37	424	30.2	78	423	30.3	119	422	30.3	37	439	30	78	438	29.9	119	438	29.8
38	424	30.2	79	423	30.3	120	422	30.3	38	439	30	79	438	29.9	120	438	29.7
39	424	30.2	80	423	30.3				39	439	30	80	438	29.9			

A.6.7 I.P.: 800 psi, I.T.: 27.7 sec

A.6.8 I.P.: 825 psi, I.T.: 27.6 sec

Time	P	T	40	465	30.2	81	464	30.1	Time	P	T	40	502	30	81	502	30.2
0	800	30.5	41	465	30.1	82	464	30.2	0	825	32	41	502	30	82	502	30.2
1	658	32.7	42	465	30.1	83	464	30.2	1	678	32.7	42	502	30	83	502	30.2
2	598	32.8	43	465	30.1	84	464	30.2	2	611	32.6	43	502	30	84	501	30.2
3	560	32.8	44	465	30.2	85	464	30.2	3	576	32.1	44	502	30	85	501	30.2
4	535	32.4	45	465	30.2	86	464	30.1	4	554	31.6	45	502	30	86	501	30.2
5	519	32.2	46	465	30.1	87	464	30.2	5	541	31.3	46	501	30	87	502	30.2
6	507	32	47	465	30.1	88	464	30.2	6	531	31.1	47	501	30	88	502	30.2
7	499	31.9	48	465	30.1	89	464	30.2	7	524	30.8	48	501	30	89	502	30.2
8	492	31.7	49	465	30.1	90	464	30.2	8	518	30.7	49	502	30	90	502	30.2
9	487	31.6	50	465	30.1	91	464	30.2	9	514	30.5	50	502	30	91	502	30.2
10	483	31.4	51	465	30.1	92	464	30.2	10	512	30.5	51	501	30	92	502	30.2
11	480	31.4	52	465	30.1	93	464	30.3	11	510	30.4	52	501	30	93	502	30.2
12	477	31.3	53	464	30.1	94	465	30.3	12	509	30.4	53	501	30	94	502	30.2
13	475	31.2	54	464	30.1	95	465	30.3	13	508	30.3	54	501	30	95	502	30.2
14	474	31.1	55	464	30.1	96	465	30.3	14	508	30.3	55	501	30	96	502	30.2
15	472	31	56	464	30.1	97	465	30.3	15	507	30.3	56	501	30	97	502	30.2
16	471	31	57	464	30.1	98	465	30.3	16	506	30.2	57	501	30	98	502	30.2
17	470	30.9	58	464	30.1	99	465	30.3	17	506	30.2	58	501	30	99	502	30.2
18	469	30.8	59	464	30.1	100	465	30.3	18	505	30.2	59	501	30	100	502	30.2
19	468	30.8	60	464	30.1	101	465	30.3	19	505	30.1	60	501	30	101	502	30.2
20	467	30.7	61	464	30.1	102	465	30.3	20	504	30.1	61	501	30.1	102	502	30.2
21	467	30.7	62	464	30.1	103	465	30.3	21	504	30.1	62	501	30.1	103	502	30.2
22	467	30.7	63	464	30.1	104	465	30.3	22	503	30.1	63	502	30.1	104	502	30.2
23	467	30.6	64	464	30.1	105	465	30.3	23	503	30	64	501	30.1	105	502	30.2
24	467	30.6	65	464	30.1	106	465	30.3	24	503	30	65	501	30.1	106	502	30.2
25	467	30.5	66	464	30.1	107	465	30.3	25	503	30	66	501	30.1	107	502	30.2
26	467	30.5	67	464	30.1	108	465	30.4	26	503	30	67	501	30.1	108	502	30.3
27	466	30.4	68	464	30.1	109	465	30.4	27	503	30	68	501	30.1	109	502	30.3
28	466	30.4	69	464	30.1	110	465	30.4	28	502	30	69	501	30.1	110	502	30.3
29	466	30.4	70	464	30.1	111	465	30.4	29	502	30	70	501	30.2	111	502	30.3
30	466	30.3	71	464	30.1	112	465	30.4	30	502	30	71	501	30.2	112	502	30.3
31	466	30.3	72	464	30.1	113	465	30.4	31	502	30	72	501	30.2	113	502	30.3
32	466	30.3	73	464	30.1	114	465	30.4	32	502	30	73	501	30.2	114	502	30.3
33	466	30.3	74	464	30.1	115	465	30.4	33	502	30	74	502	30.2	115	502	30.3
34	466	30.3	75	464	30.1	116	465	30.4	34	502	30	75	502	30.2	116	502	30.3
35	466	30.2	76	464	30.1	117	465	30.5	35	502	30	76	502	30.2	117	502	30.3
36	465	30.2	77	464	30.1	118	465	30.5	36	502	30	77	502	30.2	118	502	30.3
37	466	30.2	78	464	30.2	119	465	30.5	37	502	30	78	502	30.2	119	502	30.3
38	465	30.2	79	464	30.1	120	465	30.5	38	502	30	79	502	30.2	120	502	30.3
39	465	30.2	80	464	30.1				39	502	30	80	502	30.2			

A.6.9 I.P.: 850 psi, I.T.: 17.7 sec

Time	P	T	40	494	30.1	81	493	30.1
0	850	31.4	41	494	30.1	82	493	30.1
1	689	32.8	42	494	30.1	83	493	30.1
2	617	33.4	43	494	30.1	84	493	30.1
3	582	33.3	44	494	30.1	85	493	30.1
4	560	33	45	494	30.1	86	493	30.1
5	545	32.7	46	494	30.1	87	493	30.1
6	534	32.5	47	494	30.1	88	493	30.1
7	526	32.2	48	494	30.1	89	493	30.1
8	520	32	49	494	30.1	90	493	30.1
9	515	31.9	50	494	30.1	91	493	30.1
10	511	31.7	51	494	30.1	92	493	30.1
11	508	31.5	52	494	30.1	93	493	30.1
12	505	31.4	53	494	30.1	94	493	30
13	503	31.2	54	494	30.1	95	493	30
14	501	31.1	55	494	30.1	96	493	30
15	499	30.9	56	494	30.1	97	493	30
16	498	30.8	57	494	30.1	98	493	30
17	497	30.8	58	494	30.1	99	493	30
18	496	30.6	59	494	30.1	100	493	30
19	496	30.6	60	494	30.1	101	493	30
20	495	30.5	61	494	30.1	102	493	30
21	495	30.4	62	494	30.1	103	493	30
22	494	30.2	63	494	30.1	104	493	30
23	494	30.2	64	494	30.1	105	493	30
24	494	30.1	65	494	30.1	106	493	30
25	494	30.1	66	494	30.1	107	492	30
26	494	30	67	494	30.1	108	492	30
27	494	30	68	494	30.1	109	492	30
28	494	30	69	494	30	110	492	30
29	494	30	70	494	30	111	492	30
30	494	30	71	493	30	112	492	30
31	494	30	72	493	30	113	492	30
32	494	30	73	493	30	114	492	30
33	494	30	74	493	30	115	492	30
34	494	30	75	493	30	116	492	30
35	494	30	76	493	30	117	492	30
36	494	30	77	493	30	118	492	30
37	494	30	78	493	30	119	492	30
38	494	30.1	79	493	30	120	492	30
39	494	30.1	80	493	30			

A.6.10 I.P.: 900 psi, I.T.: 25.1 sec

Time	P	T	40	542	30.2	81	539	29.9
0	900	31	41	542	30.2	82	539	29.9
1	733	33.4	42	542	30.2	83	539	29.9
2	666	34	43	542	30.2	84	539	29.9
3	628	33.9	44	542	30.2	85	539	29.9
4	604	33.6	45	541	30.2	86	539	29.9
5	588	33.2	46	541	30.2	87	539	29.9
6	578	32.7	47	541	30.1	88	539	29.9
7	570	32.5	48	541	30.1	89	539	29.9
8	564	32.2	49	541	30.1	90	539	29.9
9	560	32	50	541	30.1	91	539	29.9
10	556	31.8	51	541	30.1	92	539	29.9
11	553	31.5	52	541	30.1	93	539	29.9
12	551	31.4	53	541	30.1	94	539	29.9
13	548	31.2	54	541	30.1	95	539	29.8
14	547	31	55	541	30.1	96	539	29.8
15	545	30.9	56	541	30.1	97	539	29.8
16	544	30.9	57	541	30.1	98	539	29.8
17	543	30.7	58	541	30	99	539	29.8
18	542	30.6	59	541	30	100	539	29.8
19	541	30.5	60	541	30	101	539	29.8
20	541	30.5	61	541	30	102	539	29.8
21	541	30.5	62	541	30	103	539	29.8
22	541	30.5	63	540	30	104	539	29.8
23	541	30.5	64	540	30	105	538	29.8
24	541	30.4	65	540	30	106	538	29.8
25	541	30.4	66	540	30	107	538	29.8
26	542	30.3	67	540	30	108	538	29.8
27	542	30.3	68	540	30	109	538	29.8
28	542	30.3	69	540	30	110	538	29.7
29	542	30.3	70	540	30	111	539	29.8
30	542	30.3	71	540	30	112	539	29.8
31	542	30.3	72	540	30	113	539	29.9
32	542	30.3	73	540	30	114	540	29.9
33	542	30.2	74	540	30	115	540	30
34	542	30.2	75	540	29.9	116	540	30
35	542	30.2	76	540	29.9	117	541	30
36	542	30.2	77	540	29.9	118	541	30.1
37	542	30.2	78	540	29.9	119	541	30.1
38	542	30.2	79	540	29.9	120	541	30.1
39	542	30.2	80	540	29.9			

A.7 n-heptane at 30 degree of Celsius (Experiment 2)

A.7.1 I.P.: 600 psi, I.T.: 21.3 sec

A.7.2 I.P.: 650 psi, I.T.: 16.5 sec

Time	P	T	40	330	30	81	337	30.5	Time	P	T	40	356	30.3	81	354	30.1
0	600	30.6	41	330	30	82	337	30.5	0	650	31	41	356	30.3	82	354	30.1
1	515	32.2	42	330	29.9	83	337	30.6	1	554	32.7	42	356	30.3	83	354	30.1
2	474	32.3	43	330	29.9	84	337	30.6	2	507	32.7	43	356	30.2	84	354	30.1
3	445	32.1	44	330	29.9	85	337	30.6	3	474	32.5	44	356	30.3	85	354	30.1
4	423	31.8	45	330	29.9	86	337	30.6	4	451	32.2	45	356	30.3	86	354	30.1
5	407	31.7	46	330	29.9	87	337	30.7	5	433	32	46	356	30.3	87	354	30.1
6	394	31.5	47	330	29.8	88	337	30.7	6	420	31.8	47	356	30.3	88	354	30.1
7	382	31.4	48	330	29.8	89	337	30.7	7	410	31.7	48	356	30.3	89	354	30.1
8	370	31.2	49	330	29.8	90	337	30.7	8	401	31.6	49	356	30.3	90	354	30.1
9	360	31.2	50	329	29.8	91	337	30.7	9	394	31.5	50	356	30.3	91	353	30.1
10	352	31.1	51	329	29.8	92	337	30.8	10	387	31.4	51	355	30.3	92	353	30
11	347	31	52	329	29.8	93	337	30.8	11	382	31.3	52	356	30.3	93	353	30
12	343	31	53	329	29.8	94	337	30.8	12	377	31.2	53	355	30.3	94	353	30
13	341	30.9	54	329	29.8	95	337	30.8	13	373	31.1	54	355	30.3	95	353	30
14	339	30.9	55	329	29.8	96	337	30.9	14	370	31.1	55	355	30.3	96	353	30
15	338	30.9	56	329	29.8	97	337	30.9	15	368	31	56	355	30.3	97	353	30
16	336	30.8	57	329	29.8	98	336	30.9	16	366	30.9	57	355	30.3	98	353	29.9
17	335	30.8	58	329	29.8	99	336	30.9	17	364	30.9	58	355	30.3	99	353	29.9
18	335	30.8	59	329	29.8	100	336	30.9	18	363	30.8	59	355	30.3	100	353	29.9
19	334	30.7	60	329	29.8	101	336	30.9	19	362	30.8	60	355	30.3	101	353	29.9
20	334	30.6	61	329	29.7	102	336	31	20	361	30.7	61	355	30.3	102	353	29.9
21	334	30.6	62	329	29.7	103	336	31	21	360	30.6	62	355	30.3	103	353	29.9
22	333	30.5	63	329	29.7	104	336	31	22	360	30.5	63	355	30.2	104	353	29.9
23	333	30.4	64	329	29.7	105	336	31.1	23	359	30.5	64	355	30.3	105	353	29.9
24	333	30.3	65	329	29.7	106	336	31.1	24	359	30.4	65	355	30.3	106	353	29.9
25	333	30.3	66	329	29.6	107	336	31.1	25	358	30.4	66	355	30.3	107	353	29.8
26	332	30.3	67	329	29.6	108	336	31.1	26	358	30.4	67	355	30.3	108	352	29.9
27	332	30.3	68	329	29.6	109	336	31.1	27	357	30.3	68	355	30.2	109	352	29.9
28	332	30.2	69	330	29.6	110	336	31.1	28	357	30.3	69	355	30.2	110	352	29.9
29	332	30.2	70	331	29.6	111	336	31.1	29	357	30.3	70	355	30.2	111	352	29.9
30	331	30.1	71	332	29.8	112	336	31.1	30	356	30.3	71	355	30.2	112	352	29.8
31	331	30.1	72	333	29.8	113	335	31.1	31	356	30.2	72	354	30.2	113	352	29.8
32	331	30.1	73	333	29.9	114	335	31.1	32	356	30.2	73	354	30.2	114	352	29.8
33	331	30.1	74	334	30	115	335	31.1	33	356	30.2	74	354	30.2	115	352	29.8
34	331	30.1	75	335	30.1	116	335	31.1	34	356	30.2	75	354	30.2	116	352	29.8
35	331	30.1	76	335	30.1	117	335	31.1	35	356	30.2	76	354	30.2	117	353	29.9
36	331	30.1	77	336	30.2	118	335	31.1	36	356	30.2	77	354	30.1	118	353	29.9
37	331	30.1	78	336	30.3	119	335	31.1	37	356	30.2	78	354	30.1	119	354	30
38	331	30.1	79	336	30.4	120	335	31.1	38	356	30.2	79	354	30.2	120	354	30
39	330	30	80	336	30.4				39	356	30.3	80	354	30.2			

A.7.3 I.P.: 700 psi, I.T.: 22.0 sec

Time	P	T	40	384	30.1	81	383	30
0	700	31.3	41	384	30.1	82	383	30
1	579	32.9	42	384	30.1	83	383	30
2	525	32.7	43	384	30.1	84	383	30
3	492	32.4	44	384	30.1	85	383	30
4	469	32	45	384	30.1	86	383	30
5	452	31.8	46	384	30.1	87	383	30
6	439	31.6	47	384	30.1	88	383	30
7	429	31.4	48	384	30.1	89	383	30
8	421	31.3	49	384	30.1	90	383	30
9	415	31.2	50	384	30.1	91	383	30
10	410	31.1	51	384	30.1	92	383	30
11	406	31	52	384	30.1	93	383	30
12	402	30.9	53	383	30.1	94	383	30
13	399	30.9	54	383	30.1	95	383	30
14	397	30.8	55	383	30.1	96	383	30
15	395	30.7	56	383	30	97	383	30
16	393	30.7	57	383	30	98	383	30
17	392	30.6	58	383	30	99	383	30
18	391	30.6	59	383	30	100	383	30
19	390	30.5	60	383	30	101	383	30
20	389	30.5	61	383	30	102	383	30
21	389	30.5	62	383	30	103	383	30
22	388	30.5	63	383	30	104	383	30
23	388	30.4	64	383	30	105	383	30
24	388	30.4	65	383	30	106	383	30
25	387	30.3	66	383	30	107	383	30
26	387	30.3	67	383	30	108	383	30
27	387	30.2	68	383	30	109	383	30
28	386	30.2	69	383	30	110	383	30
29	386	30.2	70	383	30	111	383	30
30	386	30.2	71	383	30	112	383	30
31	386	30.1	72	383	30	113	383	30
32	386	30.2	73	383	30	114	383	30
33	385	30.1	74	383	30	115	383	30
34	385	30.1	75	383	30	116	383	30
35	385	30.1	76	383	30	117	383	30
36	385	30.1	77	383	30	118	383	30
37	385	30.1	78	383	30	119	383	30
38	385	30.1	79	383	30	120	383	30
39	384	30.1	80	383	30			

A.7.4 I.P.: 750 psi, I.T.: 18.6 sec

Time	P	T	40	416	30.2	81	417	30.1
0	750	31.1	41	416	30.2	82	417	30.1
1	615	32.9	42	416	30.2	83	417	30.1
2	555	32.7	43	416	30.2	84	417	30.2
3	519	32.5	44	416	30.2	85	417	30.2
4	494	32.2	45	416	30.2	86	417	30.2
5	477	32	46	416	30.1	87	417	30.2
6	466	31.8	47	416	30.1	88	417	30.1
7	457	31.7	48	416	30.1	89	417	30.1
8	450	31.6	49	416	30.1	90	417	30.1
9	444	31.5	50	416	30.1	91	417	30.1
10	440	31.4	51	416	30	92	417	30.1
11	436	31.3	52	416	30	93	417	30.1
12	430	31.2	53	416	30	94	417	30.1
13	428	31.1	54	416	30	95	417	30.1
14	427	31	55	416	30	96	417	30.2
15	425	31	56	416	30	97	417	30.2
16	423	30.9	57	416	30	98	417	30.2
17	423	30.8	58	416	30	99	417	30.2
18	422	30.7	59	416	30	100	417	30.2
19	421	30.7	60	416	30	101	417	30.2
20	420	30.6	61	416	30.1	102	417	30.2
21	420	30.5	62	416	30.1	103	417	30.2
22	420	30.5	63	416	30.1	104	417	30.2
23	419	30.5	64	416	30.1	105	417	30.2
24	419	30.4	65	416	30.1	106	417	30.2
25	419	30.4	66	417	30.1	107	417	30.2
26	418	30.3	67	416	30.1	108	417	30.2
27	418	30.4	68	417	30.1	109	417	30.2
28	418	30.3	69	417	30.1	110	417	30.2
29	418	30.3	70	417	30.1	111	417	30.2
30	418	30.3	71	417	30.1	112	417	30.2
31	417	30.3	72	417	30.1	113	417	30.2
32	417	30.3	73	417	30.1	114	417	30.2
33	417	30.3	74	417	30.1	115	417	30.2
34	417	30.3	75	417	30.1	116	417	30.2
35	417	30.3	76	417	30.1	117	417	30.2
36	417	30.3	77	417	30.1	118	417	30.2
37	417	30.3	78	417	30.1	119	417	30.2
38	417	30.2	79	417	30.1	120	417	30.2
39	416	30.2	80	417	30.1			

A.7.5 I.P.: 775 psi, I.T.: 20.5 sec

A.7.6 I.P.: 800 psi, I.T.: 20.3 sec

Time	P	T	40	441	30.2	81	440	30.2	Time	P	T	40	463	30	81	461	29.9
0	775	31.3	41	441	30.2	82	440	30.2	0	800	31.3	41	463	30	82	461	29.9
1	635	32.8	42	441	30.2	83	440	30.2	1	656	32.6	42	462	30	83	461	29.9
2	573	32.7	43	441	30.2	84	440	30.2	2	589	32.6	43	462	30	84	460	29.9
3	538	32.3	44	441	30.2	85	440	30.2	3	552	32.4	44	462	30	85	460	29.9
4	515	32.2	45	441	30.2	86	440	30.2	4	529	32.1	45	462	30	86	460	29.9
5	499	32.1	46	441	30.2	87	440	30.2	5	513	31.8	46	462	30	87	460	29.9
6	485	31.9	47	441	30.2	88	440	30.2	6	502	31.5	47	462	30	88	460	29.9
7	475	31.7	48	441	30.2	89	440	30.2	7	493	31.3	48	462	30	89	460	29.9
8	468	31.5	49	441	30.2	90	440	30.2	8	487	31	49	462	30	90	460	29.9
9	462	31.2	50	441	30.2	91	440	30.2	9	482	30.9	50	462	30	91	460	29.9
10	457	31	51	441	30.2	92	440	30.2	10	478	30.8	51	462	30	92	460	29.9
11	453	30.9	52	441	30.2	93	440	30.2	11	475	30.7	52	462	30	93	460	29.9
12	450	30.7	53	441	30.2	94	440	30.2	12	473	30.6	53	462	30	94	460	29.9
13	448	30.6	54	441	30.2	95	440	30.2	13	472	30.6	54	462	30	95	460	29.9
14	446	30.4	55	441	30.2	96	440	30.2	14	471	30.6	55	462	30	96	460	29.9
15	445	30.4	56	441	30.2	97	440	30.2	15	471	30.5	56	462	30	97	460	29.9
16	445	30.4	57	441	30.2	98	440	30.2	16	470	30.5	57	462	30	98	460	29.9
17	444	30.3	58	441	30.2	99	440	30.1	17	469	30.4	58	462	30	99	460	29.8
18	444	30.3	59	440	30.2	100	440	30.1	18	468	30.4	59	462	30	100	460	29.9
19	443	30.3	60	441	30.2	101	440	30.1	19	468	30.3	60	462	30	101	460	29.9
20	443	30.3	61	440	30.2	102	440	30.2	20	467	30.3	61	462	29.9	102	460	29.9
21	443	30.3	62	440	30.2	103	440	30.2	21	467	30.2	62	462	29.9	103	460	29.9
22	443	30.2	63	440	30.2	104	440	30.2	22	466	30.2	63	461	29.9	104	460	29.9
23	442	30.2	64	440	30.2	105	440	30.1	23	466	30.2	64	461	29.9	105	460	29.9
24	442	30.2	65	440	30.2	106	440	30.1	24	465	30.2	65	461	29.9	106	460	29.9
25	442	30.2	66	440	30.2	107	440	30.1	25	465	30.1	66	461	29.9	107	460	29.8
26	442	30.2	67	440	30.2	108	440	30.1	26	465	30.1	67	461	29.9	108	460	29.8
27	442	30.2	68	440	30.2	109	440	30.1	27	465	30.1	68	461	29.9	109	460	29.8
28	442	30.2	69	440	30.2	110	440	30.2	28	464	30.1	69	461	29.9	110	460	29.8
29	442	30.2	70	440	30.2	111	440	30.1	29	464	30.1	70	461	29.9	111	460	29.8
30	442	30.2	71	440	30.2	112	440	30.1	30	464	30.1	71	461	29.9	112	460	29.8
31	442	30.2	72	440	30.2	113	440	30.1	31	464	30.1	72	461	29.9	113	459	29.8
32	441	30.2	73	440	30.2	114	440	30.1	32	463	30.1	73	461	29.9	114	459	29.8
33	441	30.2	74	440	30.2	115	440	30.1	33	463	30.1	74	461	29.9	115	460	29.8
34	441	30.2	75	440	30.2	116	440	30.1	34	463	30.1	75	461	29.9	116	459	29.8
35	441	30.2	76	440	30.2	117	440	30.1	35	463	30.1	76	461	29.9	117	459	29.8
36	441	30.2	77	440	30.2	118	440	30.1	36	463	30.1	77	461	29.9	118	459	29.8
37	441	30.2	78	440	30.2	119	440	30.1	37	463	30.1	78	461	29.9	119	459	29.8
38	441	30.2	79	440	30.2	120	440	30.1	38	463	30.1	79	461	29.9	120	459	29.8
39	441	30.2	80	440	30.2				39	463	30	80	461	29.9			

A.7.7 I.P.: 825 psi, I.T.: 25.9 sec

Time	P	T	40	496	30.5	81	493	30.4
0	825	31.5	41	497	30.6	82	492	30.3
1	684	32.7	42	497	30.6	83	492	30.3
2	620	32.8	43	497	30.6	84	492	30.3
3	582	32.7	44	497	30.7	85	492	30.3
4	558	32.3	45	497	30.7	86	492	30.3
5	542	31.8	46	498	30.7	87	492	30.3
6	531	31.5	47	498	30.8	88	492	30.3
7	523	31.3	48	498	30.8	89	492	30.3
8	516	31	49	498	30.8	90	492	30.3
9	512	30.8	50	498	30.8	91	492	30.3
10	509	30.7	51	498	30.8	92	492	30.3
11	508	30.7	52	498	30.8	93	491	30.3
12	506	30.7	53	498	30.8	94	491	30.3
13	505	30.6	54	498	30.8	95	491	30.3
14	504	30.6	55	498	30.9	96	491	30.3
15	503	30.6	56	498	30.9	97	491	30.3
16	502	30.6	57	497	30.9	98	491	30.3
17	501	30.5	58	497	30.9	99	491	30.3
18	501	30.5	59	497	30.8	100	491	30.3
19	500	30.5	60	497	30.8	101	491	30.3
20	499	30.4	61	497	30.8	102	491	30.3
21	498	30.4	62	496	30.8	103	491	30.3
22	498	30.3	63	496	30.8	104	491	30.3
23	498	30.3	64	496	30.7	105	491	30.3
24	497	30.3	65	496	30.7	106	491	30.3
25	497	30.2	66	496	30.7	107	491	30.3
26	496	30.3	67	495	30.7	108	491	30.3
27	496	30.2	68	495	30.6	109	491	30.3
28	495	30.2	69	495	30.6	110	491	30.3
29	495	30.2	70	495	30.6	111	491	30.3
30	495	30.2	71	494	30.6	112	491	30.3
31	494	30.1	72	494	30.6	113	491	30.3
32	494	30.1	73	494	30.5	114	491	30.3
33	494	30.1	74	494	30.5	115	491	30.3
34	494	30.1	75	494	30.4	116	491	30.3
35	494	30.2	76	493	30.4	117	491	30.3
36	495	30.2	77	493	30.4	118	491	30.3
37	495	30.3	78	493	30.4	119	491	30.3
38	496	30.4	79	493	30.4	120	491	30.3
39	496	30.4	80	493	30.4			

A.8 n-heptane at 40 degree of Celsius (Experiment 1)

A.8.1 I.P.: 600 psi, I.T.: 22.3 sec

A.8.2 I.P.: 650 psi, I.T.: 23.3 sec

Time	P	T	40	362	39.9	81	362	40.3	Time	P	T	40	388	40.1	81	386	39.6
0	600	41.6	41	363	40	82	361	40.2	0	650	41.6	41	387	39.9	82	386	39.6
1	526	42.1	42	364	40.2	83	360	40.1	1	576	42.2	42	386	39.8	83	386	39.5
2	488	42	43	365	40.4	84	360	40	2	535	42	43	385	39.6	84	387	39.5
3	443	41.7	44	366	40.5	85	360	39.9	3	471	41.4	44	384	39.4	85	387	39.5
4	427	41.3	45	366	40.7	86	360	39.8	4	432	40.9	45	384	39.2	86	388	39.6
5	384	41	46	367	40.8	87	360	39.8	5	416	40.7	46	384	39.2	87	388	39.7
6	376	40.7	47	367	40.8	88	360	39.7	6	409	41	47	385	39.2	88	389	39.8
7	374	40.5	48	367	40.8	89	360	39.7	7	405	41.5	48	385	39.2	89	389	39.9
8	373	40.4	49	366	40.9	90	360	39.7	8	402	41.7	49	386	39.3	90	389	39.9
9	373	40.3	50	365	40.8	91	360	39.7	9	400	41.7	50	387	39.4	91	390	40
10	372	40.3	51	365	40.8	92	360	39.7	10	397	41.7	51	388	39.5	92	390	40
11	372	41	52	364	40.7	93	361	39.9	11	394	41.4	52	388	39.6	93	390	40.1
12	372	41.4	53	363	40.6	94	361	39.9	12	391	40.8	53	389	39.7	94	390	40.1
13	372	41.7	54	362	40.4	95	362	40	13	390	40.4	54	389	39.8	95	390	40.1
14	370	41.8	55	362	40.3	96	363	40.1	14	389	40.1	55	390	39.9	96	390	40.1
15	369	41.7	56	361	40.1	97	363	40.2	15	389	39.9	56	390	39.9	97	390	40.1
16	367	41.3	57	360	40	98	363	40.3	16	388	39.9	57	390	40	98	390	40.1
17	365	41	58	359	39.9	99	364	40.4	17	388	39.9	58	390	40	99	390	40.1
18	363	40.4	59	359	39.7	100	364	40.4	18	388	39.8	59	391	40.1	100	389	40.1
19	363	40.2	60	358	39.5	101	363	40.4	19	388	39.7	60	391	40.1	101	389	40.1
20	362	40.2	61	358	39.4	102	363	40.4	20	389	39.7	61	391	40.1	102	389	40
21	362	40.1	62	358	39.3	103	362	40.4	21	389	39.8	62	391	40.1	103	389	40
22	362	40	63	358	39.3	104	362	40.4	22	389	39.8	63	391	40.2	104	389	40
23	362	40	64	358	39.3	105	362	40.4	23	390	39.9	64	390	40.2	105	388	39.9
24	362	40	65	359	39.3	106	362	40.4	24	391	40.1	65	390	40.2	106	388	39.9
25	362	39.9	66	360	39.5	107	362	40.4	25	392	40.3	66	390	40.2	107	388	39.9
26	362	39.9	67	361	39.6	108	362	40.4	26	393	40.5	67	390	40.2	108	388	39.9
27	361	39.9	68	363	39.9	109	362	40.4	27	394	40.7	68	390	40.2	109	388	39.9
28	361	39.9	69	365	40.2	110	362	40.4	28	395	40.8	69	390	40.1	110	388	39.9
29	361	39.9	70	366	40.5	111	362	40.4	29	395	40.9	70	389	40.1	111	388	39.9
30	361	39.8	71	367	40.7	112	362	40.4	30	395	40.9	71	389	40.1	112	388	39.9
31	361	39.7	72	367	40.8	113	362	40.4	31	395	40.9	72	389	40	113	388	39.9
32	361	39.7	73	367	40.9	114	362	40.4	32	394	40.9	73	389	40	114	388	39.9
33	360	39.7	74	367	41	115	362	40.4	33	394	40.9	74	388	39.9	115	388	39.9
34	360	39.6	75	366	41	116	362	40.4	34	393	40.8	75	388	39.9	116	388	39.9
35	360	39.6	76	366	41	117	362	40.4	35	392	40.7	76	388	39.8	117	388	39.9
36	361	39.6	77	365	40.9	118	362	40.4	36	391	40.6	77	387	39.8	118	388	39.9
37	361	39.6	78	364	40.7	119	362	40.4	37	390	40.5	78	387	39.8	119	388	39.9
38	361	39.7	79	363	40.6	120	362	40.4	38	389	40.4	79	387	39.8	120	388	39.9
39	362	39.8	80	362	40.5				39	388	40.2	80	387	39.7			

A.8.3 I.P.: 700 psi, I.T.: 13.3 sec

Time	P	T	40	418	39.9	81	418	39.8
0	700	41.9	41	419	40	82	419	40
1	618	42.4	42	420	40.1	83	421	40.3
2	564	42.1	43	420	40.2	84	422	40.5
3	509	41.7	44	421	40.3	85	423	40.7
4	466	42	45	421	40.3	86	424	40.9
5	447	42	46	421	40.4	87	424	40.9
6	437	41.9	47	421	40.5	88	423	40.9
7	430	41.7	48	421	40.5	89	422	40.9
8	426	41.4	49	421	40.5	90	421	40.8
9	422	40.9	50	421	40.6	91	420	40.7
10	420	40.5	51	421	40.6	92	419	40.5
11	419	40.2	52	421	40.6	93	418	40.4
12	418	39.9	53	421	40.6	94	418	40.2
13	418	39.9	54	421	40.5	95	417	40.1
14	418	39.9	55	420	40.5	96	417	40.1
15	418	39.8	56	420	40.5	97	417	40
16	418	39.9	57	420	40.5	98	416	40
17	418	39.9	58	419	40.4	99	416	39.9
18	418	39.9	59	419	40.4	100	416	39.9
19	418	39.9	60	419	40.4	101	416	39.9
20	418	39.9	61	418	40.3	102	416	39.8
21	418	39.9	62	418	40.3	103	416	39.8
22	418	39.9	63	418	40.1	104	416	39.8
23	418	39.9	64	417	40.1	105	417	39.8
24	418	39.9	65	417	40	106	417	39.9
25	418	39.9	66	416	39.9	107	418	40
26	418	39.9	67	416	39.9	108	419	40.1
27	417	39.9	68	416	39.8	109	419	40.2
28	417	39.9	69	415	39.8	110	419	40.2
29	417	39.9	70	415	39.7	111	420	40.3
30	417	39.8	71	414	39.6	112	420	40.4
31	416	39.7	72	414	39.6	113	420	40.4
32	416	39.7	73	414	39.5	114	420	40.4
33	416	39.7	74	413	39.4	115	420	40.5
34	416	39.5	75	413	39.4	116	420	40.5
35	415	39.5	76	413	39.3	117	420	40.5
36	415	39.5	77	413	39.3	118	420	40.5
37	416	39.5	78	414	39.3	119	420	40.5
38	417	39.6	79	415	39.3	120	419	40.5
39	417	39.7	80	416	39.5			

A.8.4 I.P.: 750 psi, I.T.: 26.8 sec

Time	P	T	40	459	40.1	81	456	39.8
0	750	41.5	41	460	40.1	82	456	39.7
1	659	42.5	42	460	40.2	83	455	39.7
2	613	42.4	43	461	40.3	84	455	39.7
3	577	42.1	44	461	40.4	85	455	39.6
4	550	42.5	45	461	40.5	86	456	39.7
5	531	42.4	46	461	40.5	87	456	39.8
6	516	42.1	47	461	40.5	88	457	39.8
7	504	42	48	461	40.5	89	457	40
8	494	41.7	49	461	40.5	90	458	40.1
9	486	41.3	50	461	40.5	91	459	40.2
10	480	40.9	51	460	40.3	92	459	40.3
11	475	40.6	52	459	40.2	93	459	40.3
12	472	40.3	53	458	40.1	94	460	40.4
13	470	40.3	54	458	40.1	95	460	40.4
14	468	40.3	55	457	40	96	460	40.5
15	467	40.3	56	457	40	97	460	40.5
16	466	40.5	57	457	39.9	98	459	40.4
17	466	40.5	58	456	39.9	99	459	40.4
18	465	40.6	59	456	39.8	100	459	40.3
19	465	40.6	60	456	39.7	101	458	40.3
20	464	40.6	61	455	39.6	102	458	40.3
21	464	40.7	62	455	39.6	103	458	40.2
22	464	40.7	63	455	39.5	104	458	40.2
23	464	40.7	64	456	39.5	105	457	40.1
24	463	40.7	65	457	39.7	106	457	40.1
25	463	40.7	66	459	40	107	456	40
26	462	40.6	67	461	40.2	108	456	40
27	461	40.5	68	462	40.5	109	456	39.9
28	460	40.3	69	463	40.7	110	455	39.8
29	459	40.2	70	464	40.8	111	455	39.8
30	458	40.1	71	464	40.9	112	455	39.7
31	457	39.9	72	463	40.9	113	454	39.7
32	457	39.8	73	463	40.9	114	454	39.7
33	457	39.8	74	462	40.8	115	455	39.7
34	456	39.7	75	461	40.7	116	455	39.7
35	456	39.6	76	460	40.6	117	455	39.7
36	457	39.6	77	459	40.4	118	456	39.8
37	457	39.8	78	458	40.2	119	457	39.9
38	458	39.9	79	457	40.1	120	457	40
39	459	40	80	456	39.9			

A.8.5 I.P.: 800 psi, I.T.: 21.1 sec

Time	P	T	40	495	39.8	81	497	40.1
0	800	41.4	41	495	39.8	82	496	40
1	692	42	42	494	39.7	83	494	39.8
2	635	42	43	494	39.6	84	493	39.6
3	597	41.9	44	493	39.6	85	492	39.5
4	571	42	45	493	39.6	86	492	39.3
5	552	41.9	46	493	39.5	87	492	39.2
6	538	41.5	47	493	39.5	88	492	39.2
7	527	41.1	48	493	39.5	89	494	39.3
8	521	40.7	49	494	39.5	90	496	39.5
9	517	40.6	50	496	39.7	91	498	39.9
10	514	40.6	51	498	40	92	501	40.3
11	511	40.5	52	499	40.2	93	503	40.6
12	509	40.4	53	499	40.3	94	504	40.8
13	507	40.4	54	499	40.4	95	504	41
14	506	40.4	55	499	40.4	96	504	41
15	505	40.4	56	498	40.4	97	504	41
16	504	40.4	57	498	40.3	98	503	41
17	503	40.4	58	497	40.2	99	502	40.9
18	503	40.4	59	496	40.1	100	501	40.7
19	502	40.4	60	496	39.9	101	500	40.6
20	502	40.5	61	495	39.8	102	499	40.4
21	502	40.4	62	495	39.7	103	498	40.2
22	501	40.4	63	495	39.7	104	497	40.1
23	501	40.4	64	495	39.6	105	496	40
24	501	40.4	65	495	39.6	106	496	39.8
25	500	40.4	66	495	39.6	107	495	39.8
26	500	40.3	67	495	39.6	108	495	39.7
27	500	40.3	68	495	39.6	109	495	39.7
28	499	40.3	69	496	39.7	110	495	39.7
29	499	40.3	70	497	39.9	111	496	39.7
30	499	40.3	71	497	40	112	497	39.9
31	498	40.2	72	498	40.1	113	498	40
32	498	40.2	73	498	40.2	114	499	40.1
33	498	40.2	74	499	40.3	115	499	40.2
34	497	40.1	75	499	40.3	116	499	40.2
35	497	40.1	76	499	40.4	117	499	40.2
36	497	40.1	77	499	40.4	118	498	40.2
37	496	40.1	78	499	40.4	119	497	40.1
38	496	39.9	79	498	40.3	120	496	40
39	496	39.9	80	497	40.2			

A.8.6 I.P.: 850 psi, I.T.: 20.5 sec

Time	P	T	40	542	40.1	81	539	39.9
0	850	42	41	543	40.2	82	539	39.8
1	738	43.1	42	543	40.2	83	539	39.7
2	674	43.8	43	544	40.3	84	538	39.7
3	637	43.7	44	544	40.4	85	538	39.7
4	611	43.2	45	544	40.4	86	538	39.6
5	593	42.7	46	544	40.5	87	537	39.6
6	580	42.1	47	545	40.5	88	537	39.5
7	570	41.8	48	545	40.5	89	537	39.5
8	562	41.3	49	545	40.6	90	538	39.5
9	555	40.8	50	545	40.6	91	538	39.6
10	553	40.6	51	544	40.6	92	540	39.7
11	553	40.5	52	544	40.6	93	542	40
12	551	40.5	53	543	40.5	94	544	40.3
13	550	40.5	54	542	40.4	95	546	40.6
14	548	40.5	55	541	40.2	96	548	40.9
15	547	40.3	56	541	40.1	97	550	41.1
16	545	40.2	57	540	39.9	98	552	41.3
17	544	40	58	539	39.8	99	553	41.6
18	542	39.9	59	539	39.7	100	554	41.8
19	541	39.7	60	538	39.6	101	551	41.8
20	540	39.6	61	538	39.5	102	549	41.4
21	539	39.5	62	537	39.5	103	546	41
22	538	39.4	63	537	39.5	104	545	40.6
23	538	39.3	64	538	39.5	105	545	40.4
24	538	39.3	65	538	39.6	106	545	40.3
25	539	39.4	66	538	39.6	107	544	40.3
26	541	39.8	67	539	39.7	108	543	40.3
27	543	40	68	539	39.7	109	543	40.2
28	544	40.2	69	539	39.8	110	542	40
29	544	40.3	70	540	39.8	111	541	39.9
30	544	40.4	71	540	39.9	112	540	39.8
31	544	40.4	72	540	39.9	113	539	39.7
32	543	40.3	73	540	39.9	114	539	39.7
33	543	40.2	74	540	39.9	115	539	39.7
34	542	40.1	75	540	39.9	116	538	39.6
35	541	40	76	540	39.9	117	538	39.6
36	541	40	77	540	39.9	118	539	39.6
37	541	39.9	78	540	39.9	119	539	39.6
38	541	39.9	79	540	39.9	120	540	39.7
39	542	40	80	539	39.9			

A.8.7 I.P.: 910 psi, I.T.: 22.6 sec

A.8.6 I.P.: 930 psi, I.T.: 24.9 sec

Time	P	T	40	594	40.6	81	586	39.8	Time	T	P	40	39.70	638	81	40.10	641
0	910	41.5	41	591	40.6	82	586	39.7	0	41.30	930	41	39.70	638	82	40.10	640
1	779	42.9	42	591	40.3	83	586	39.7	1	43.20	806	42	39.60	637	83	40.10	640
2	706	43.2	43	591	40.2	84	586	39.6	2	43.30	734	43	39.60	637	84	40.00	640
3	668	42.7	44	590	40.2	85	585	39.6	3	42.50	697	44	39.50	637	85	40.00	640
4	642	42.1	45	590	40.1	86	585	39.6	4	41.80	675	45	39.50	636	86	39.90	640
5	625	41.7	46	589	40.1	87	585	39.6	5	41.00	660	46	39.40	636	87	39.90	639
6	612	41.1	47	588	40	88	586	39.6	6	40.40	652	47	39.50	636	88	39.90	639
7	603	40.6	48	587	39.8	89	587	39.8	7	40.00	650	48	39.40	635	89	39.80	638
8	601	40.3	49	586	39.6	90	588	39.9	8	40.10	649	49	39.40	636	90	39.70	638
9	600	40.2	50	586	39.5	91	589	40.1	9	40.10	647	50	39.50	638	91	39.70	638
10	601	40.5	51	585	39.5	92	590	40.2	10	40.20	646	51	39.80	641	92	39.70	637
11	602	41	52	586	39.6	93	590	40.3	11	40.20	645	52	40.30	644	93	39.70	637
12	603	41.4	53	588	39.8	94	590	40.3	12	40.10	643	53	40.80	648	94	39.60	637
13	600	41.6	54	590	40.1	95	590	40.3	13	40.10	642	54	40.90	645	95	39.50	636
14	596	41.2	55	592	40.4	96	589	40.3	14	39.90	640	55	40.70	646	96	39.50	636
15	596	40.7	56	594	40.6	97	589	40.1	15	39.70	639	56	40.70	647	97	39.40	636
16	595	40.5	57	594	40.9	98	588	40	16	39.70	638	57	40.70	647	98	39.40	635
17	596	40.5	58	595	41	99	587	39.8	17	39.50	637	58	40.70	647	99	39.30	635
18	597	40.7	59	595	41	100	586	39.7	18	39.50	637	59	40.70	647	100	39.30	634
19	598	40.9	60	594	40.9	101	586	39.7	19	39.50	637	60	40.70	646	101	39.30	634
20	598	41.1	61	593	40.8	102	586	39.6	20	39.50	638	61	40.60	645	102	39.30	634
21	598	41.2	62	592	40.7	103	586	39.6	21	39.50	638	62	40.40	644	103	39.30	634
22	598	41.2	63	591	40.5	104	586	39.7	22	39.60	638	63	40.30	643	104	39.40	634
23	597	41.1	64	590	40.3	105	587	39.7	23	39.70	638	64	40.20	642	105	39.40	634
24	596	41	65	589	40.1	106	587	39.8	24	39.70	639	65	40.00	641	106	39.50	634
25	595	40.8	66	588	40	107	587	39.8	25	39.80	639	66	40.00	641	107	39.50	634
26	593	40.7	67	587	39.8	108	587	39.9	26	39.80	639	67	40.00	641	108	39.70	634
27	592	40.5	68	587	39.7	109	587	39.9	27	39.80	639	68	40.00	641	109	39.70	634
28	591	40.3	69	586	39.7	110	587	39.9	28	39.80	639	69	40.00	641	110	39.70	634
29	590	40.1	70	586	39.7	111	588	39.9	29	39.80	640	70	40.00	641	111	39.70	634
30	589	39.9	71	586	39.7	112	588	39.9	30	39.80	640	71	40.10	641	112	39.90	635
31	589	39.8	72	586	39.7	113	588	39.9	31	39.80	639	72	40.10	641	113	39.90	635
32	588	39.8	73	586	39.7	114	587	39.9	32	39.90	639	73	40.10	641	114	39.90	635
33	588	39.7	74	586	39.8	115	587	39.9	33	39.90	639	74	40.10	641	115	39.90	635
34	588	39.7	75	587	39.8	116	587	39.9	34	39.90	639	75	40.20	641	116	39.90	635
35	588	39.7	76	586	39.8	117	587	39.9	35	39.90	639	76	40.20	641	117	39.90	635
36	589	39.8	77	586	39.8	118	587	39.8	36	39.80	639	77	40.20	641	118	39.90	635
37	590	40	78	587	39.8	119	586	39.7	37	39.80	639	78	40.20	641	119	39.90	635
38	592	40.3	79	586	39.8	120	586	39.7	38	39.80	638	79	40.20	641	120	39.90	635
39	593	40.5	80	586	39.8				39	39.70	638	80	40.10	641			

A.8.9 I.P.: 950 psi, I.T.: 18.4 sec

Time	T	P	40	40.10	665	81	40.00	664
0	41.50	950	41	40.10	665	82	40.10	664
1	43.00	827	42	40.20	666	83	40.10	664
2	43.30	765	43	40.20	666	84	40.00	663
3	43.20	738	44	40.30	666	85	40.00	663
4	42.80	717	45	40.20	665	86	40.00	663
5	42.30	702	46	40.10	665	87	40.00	663
6	42.00	691	47	40.10	664	88	39.90	663
7	41.60	683	48	40.00	663	89	39.90	662
8	41.30	681	49	39.90	662	90	39.90	662
9	41.30	679	50	39.80	662	91	39.80	662
10	41.30	677	51	39.70	661	92	39.80	662
11	41.20	675	52	39.60	661	93	39.80	661
12	41.20	674	53	39.70	662	94	39.70	661
13	41.10	672	54	39.90	664	95	39.70	661
14	40.90	670	55	40.30	668	96	39.70	661
15	40.80	669	56	40.60	670	97	39.70	662
16	40.50	668	57	40.90	671	98	39.90	664
17	40.30	666	58	41.00	672	99	40.20	666
18	40.20	665	59	41.00	672	100	40.40	667
19	40.00	664	60	41.00	671	101	40.50	667
20	39.90	663	61	40.90	671	102	40.50	668
21	39.80	662	62	40.80	670	103	40.50	667
22	39.70	662	63	40.70	669	104	40.50	667
23	39.70	663	64	40.60	669	105	40.40	666
24	39.90	665	65	40.50	668	106	40.30	666
25	40.30	668	66	40.40	666	107	40.20	665
26	40.70	670	67	40.20	665	108	40.10	664
27	40.90	671	68	40.10	664	109	40.00	663
28	41.00	671	69	40.00	664	110	39.90	662
29	41.00	671	70	39.90	663	111	39.70	662
30	41.00	671	71	39.80	663	112	39.70	662
31	40.90	670	72	39.80	663	113	39.70	662
32	40.80	669	73	39.80	663	114	39.70	662
33	40.60	668	74	39.90	663	115	39.70	662
34	40.50	667	75	39.90	663	116	39.80	662
35	40.40	666	76	39.90	663	117	40.00	665
36	40.30	665	77	40.00	663	118	40.30	667
37	40.10	665	78	40.00	664	119	40.50	668
38	40.00	665	79	40.00	664	120	40.60	668
39	40.00	665	80	40.00	664			

A.9 Crude oil at 40 degree of Celsius (Experiment 1)

A.9.1 I.P.: 700 psi, I.T.: 25.0 sec

Time	T	P	40	40 70	505	81	41 30	501	122	40.00	496	163	40 30	494	204	40.00	491
0	41 90	700	41	41 10	506	82	41 20	501	123	40 30	497	164	40 30	493	205	39 90	490
1	43 10	625	42	41 30	506	83	41 00	500	124	40 50	499	165	40 30	493	206	39 80	490
2	42 90	602	43	41 50	506	84	40 90	498	125	40 70	500	166	40 30	493	207	39 80	490
3	42 50	586	44	41 70	506	85	40 70	497	126	40 90	501	167	40 30	493	208	39 70	491
4	42 00	571	45	41 70	505	86	40 60	496	127	41 10	502	168	40 30	493	209	39 80	492
5	41 40	558	46	41 70	505	87	40 40	496	128	41 30	503	169	40 30	493	210	39 80	493
6	41 00	548	47	41 70	504	88	40 30	495	129	41 50	503	170	40 30	493	211	40 00	495
7	40 60	544	48	41 60	503	89	40 10	494	130	41 70	504	171	40 30	493	212	40 20	497
8	40 40	541	49	41 40	502	90	40 00	494	131	41 90	504	172	40 20	492	213	40 50	500
9	40 40	538	50	41 30	501	91	39 80	494	132	41 90	504	173	40 20	492	214	40 90	502
10	40 60	535	51	41 10	500	92	39 80	494	133	41 90	504	174	40 10	492	215	41 30	503
11	40 70	533	52	41 00	499	93	39 80	495	134	41 90	503	175	40 20	493	216	41 50	504
12	41 00	531	53	40 80	498	94	39 90	496	135	41 90	503	176	40 20	493	217	41 80	503
13	41 20	530	54	40 70	497	95	40 10	498	136	41 80	502	177	40 20	494	218	41 80	502
14	41 50	529	55	40 60	496	96	40 40	499	137	41 80	501	178	40 30	494	219	41 70	501
15	41 70	524	56	40 40	495	97	40 60	500	138	41 70	500	179	40 30	494	220	41 50	500
16	41 60	520	57	40 20	494	98	40 80	501	139	41 60	499	180	40 40	495	221	41 30	498
17	41 20	517	58	40 00	493	99	41 00	502	140	41 40	499	181	40 50	495	222	41 30	499
18	41 00	517	59	39 90	492	100	41 20	502	141	41 30	498	182	40 60	495	223	41 20	499
19	40 90	516	60	39 70	492	101	41 30	503	142	41 10	497	183	40 60	495	224	41 20	498
20	41 10	515	61	39 60	491	102	41 50	503	143	40 90	496	184	40 60	495	225	41 20	498
21	41 10	514	62	39 40	490	103	41 60	502	144	40 70	495	185	40 60	495	226	41 10	497
22	41 10	512	63	39 20	489	104	41 60	502	145	40 60	494	186	40 60	495	227	41 10	497
23	41 10	511	64	39 20	488	105	41 40	501	146	40 40	493	187	40 70	495	228	41 00	496
24	41 00	509	65	39 20	496	106	41 40	501	147	40 30	492	188	40 70	495	229	40 90	495
25	40 90	508	66	39 50	497	107	41 40	500	148	40 10	492	189	40 70	495	230	40 80	495
26	40 80	507	67	39 90	499	108	41 20	499	149	40 00	491	190	40 70	495	231	40 70	494
27	40 70	505	68	40 10	500	109	41 10	498	150	39 80	491	191	40 70	495	232	40 70	493
28	40 60	504	69	40 40	502	110	40 90	497	151	39 80	491	192	40 70	495	233	40 50	493
29	40 40	502	70	40 70	503	111	40 90	496	152	39 80	492	193	40 70	494	234	40 40	492
30	40 30	501	71	40 90	503	112	40 70	496	153	39 80	492	194	40 60	494	235	40 40	492
31	40 10	500	72	41 00	504	113	40 50	495	154	39 80	492	195	40 50	494	236	40 40	492
32	40 00	499	73	41 20	505	114	40 30	494	155	39 80	492	196	40 50	494	237	40 40	492
33	39 80	498	74	41 30	505	115	40 20	493	156	39 90	493	197	40 40	493	238	40 40	492
34	39 70	497	75	41 40	505	116	40 10	492	157	39 90	493	198	40 40	493	239	40 40	493
35	39 50	497	76	41 40	505	117	40 10	492	158	40 10	493	199	40 30	493	240	40 40	492
36	39 60	499	77	41 50	505	118	39 90	492	159	40 20	493	200	40 20	492			
37	39 70	500	78	41 50	504	119	39 80	492	160	40 20	494	201	40 20	492			
38	39 90	502	79	41 50	503	120	39 80	493	161	40 30	493	202	40 10	492			
39	40 40	504	80	41 40	502	121	39 90	495	162	40 30	493	203	40 10	491			

A.9.2 I.P.: 800 psi, I.T.: 22.3 sec

Time	T	P	40	41 00	577	81	39 30	562	122	41 00	570	163	41 20	573	204	41 60	575
0	42 00	800	41	40 90	576	82	39 30	564	123	40 90	569	164	41 20	573	205	41 40	574
1	43 30	745	42	40 70	575	83	39 60	566	124	40 80	568	165	41 10	572	206	41 40	574
2	43 30	718	43	40 60	574	84	39 80	569	125	40 70	568	166	41 10	572	207	41 30	573
3	42 90	698	44	40 60	573	85	40 30	571	126	40 70	568	167	41 10	571	208	41 20	573
4	42 60	681	45	40 40	573	86	40 60	571	127	40 60	568	168	41 00	571	209	41 10	572
5	42 30	663	46	40 40	572	87	40 70	570	128	40 60	567	169	40 90	570	210	41 00	571
6	42 00	646	47	40 40	572	88	40 70	570	129	40 50	567	170	40 80	570	211	40 90	570
7	41 40	632	48	40 30	571	89	40 60	571	130	40 40	566	171	40 70	569	212	40 80	570
8	41 10	627	49	40 30	571	90	40 60	571	131	40 30	566	172	40 70	569	213	40 70	569
9	40 90	622	50	40 30	570	91	40 60	571	132	40 10	566	173	40 60	568	214	40 60	568
10	40 80	618	51	40 20	570	92	40 70	571	133	40 10	566	174	40 50	567	215	40 50	568
11	40 80	614	52	40 30	570	93	40 80	571	134	40 10	566	175	40 40	567	216	40 40	567
12	40 80	610	53	40 30	569	94	40 70	570	135	40 10	566	176	40 30	566	217	40 40	566
13	40 70	607	54	40 20	569	95	40 70	570	136	40 10	565	177	40 20	565	218	40 30	566
14	40 60	603	55	40 20	569	96	40 50	569	137	40 10	565	178	40 10	565	219	40 20	566
15	40 60	600	56	40 10	568	97	40 50	569	138	40 10	565	179	40 00	564	220	40 20	565
16	40 50	597	57	40 10	568	98	40 40	568	139	40 00	565	180	40 00	564	221	40 20	565
17	40 40	595	58	40 10	568	99	40 30	567	140	40 00	565	181	39 90	563	222	40 10	565
18	40 30	593	59	40 10	567	100	40 20	566	141	40 00	565	182	39 80	562	223	40 10	564
19	40 20	590	60	40 10	567	101	40 10	566	142	40 00	565	183	39 70	562	224	40 00	564
20	40 10	589	61	40 10	567	102	40 10	565	143	40 00	565	184	39 60	561	225	40 00	564
21	40 00	587	62	40 00	566	103	40 00	564	144	40 00	564	185	39 50	561	226	40 00	563
22	39 90	586	63	40 00	566	104	39 80	564	145	40 00	564	186	39 40	561	227	39 90	563
23	40 00	586	64	40 00	566	105	39 70	563	146	39 90	564	187	39 40	563	228	39 90	563
24	40 10	586	65	39 90	565	106	39 60	563	147	39 90	564	188	39 60	566	229	39 90	563
25	40 20	587	66	39 90	565	107	39 60	565	148	39 90	564	189	39 80	568	230	39 80	563
26	40 60	587	67	39 80	564	108	39 70	568	149	39 90	564	190	40 20	571	231	39 80	563
27	41 00	587	68	39 90	564	109	40 00	570	150	39 90	563	191	40 50	573	232	39 90	564
28	41 10	588	69	39 80	564	110	40 50	573	151	39 90	563	192	40 90	575	233	39 90	564
29	41 40	587	70	39 70	564	111	40 80	576	152	39 80	564	193	41 30	576	234	40 00	564
30	41 50	586	71	39 70	563	112	41 30	579	153	39 80	565	194	41 50	577	235	40 10	565
31	41 50	586	72	39 70	563	113	41 70	578	154	39 90	566	195	41 60	578	236	40 10	565
32	41 60	585	73	39 70	562	114	41 80	578	155	40 20	568	196	41 70	578	237	40 10	565
33	41 60	584	74	39 60	562	115	41 80	578	156	40 30	570	197	41 80	578	238	40 10	565
34	41 50	583	75	39 50	562	116	41 70	577	157	40 60	571	198	41 80	578	239	40 20	564
35	41 50	582	76	39 40	561	117	41 60	576	158	40 70	572	199	41 80	577	240	40 10	564
36	41 40	581	77	39 40	561	118	41 50	575	159	40 90	572	200	41 80	577			
37	41 30	580	78	39 40	561	119	41 40	574	160	41 10	573	201	41 70	577			
38	41 20	579	79	39 40	560	120	41 30	573	161	41 10	573	202	41 70	576			
39	41 20	578	80	39 30	560	121	41 10	571	162	41 20	573	203	41 60	576			

A.9.3 I.P.: 850 psi, I.T.: 27.9 sec

Time	T	P	40	40 30	611	81	39 90	606	122	40 00	606	163	40 30	607	204	39 60	604
0	42.00	850	41	40 30	611	82	40 00	607	123	39 90	606	164	40 40	608	205	39 70	604
1	43.20	797	42	40 30	611	83	40 10	608	124	39 90	605	165	40 50	608	206	39 70	604
2	42.90	766	43	40 30	610	84	40 40	609	125	39 80	605	166	40 60	609	207	39 70	604
3	42 30	744	44	40 30	610	85	40 60	610	126	39 70	605	167	40 70	609	208	39 70	604
4	42.00	724	45	40 30	610	86	40 80	611	127	39 60	605	168	40 70	609	209	39 80	604
5	41 70	707	46	40 30	609	87	41 00	612	128	39 70	605	169	40 70	610	210	39 80	604
6	41.40	692	47	40 30	609	88	41 20	612	129	39 80	606	170	40 80	610	211	39 80	605
7	41.00	682	48	40 30	609	89	41 20	612	130	40 10	608	171	40 80	610	212	39 80	605
8	40 90	676	49	40 30	609	90	41 20	612	131	40 40	609	172	40 80	610	213	39 80	604
9	40 90	670	50	40 30	608	91	41 10	611	132	40 80	611	173	40 80	610	214	39 80	604
10	40 90	664	51	40 30	608	92	40 90	611	133	41 00	612	174	40 80	610	215	39 80	604
11	41 20	659	52	40 20	607	93	40 80	610	134	41 20	612	175	40 80	610	216	39 80	604
12	41 40	655	53	40 20	607	94	40 60	610	135	41 20	612	176	40 80	610	217	39 80	604
13	41 40	650	54	40 10	607	95	40 50	609	136	41 30	612	177	40 80	610	218	39 80	604
14	41 20	646	55	40 10	606	96	40 40	608	137	41 20	612	178	40 80	610	219	39 70	603
15	41 20	642	56	40 00	606	97	40 30	608	138	41 10	611	179	40 70	610	220	39 70	603
16	41 00	638	57	40 00	606	98	40 10	607	139	41 00	611	180	40 70	610	221	39 70	603
17	40 70	635	58	39 90	606	99	40 00	606	140	40 90	610	181	40 70	609	222	39 70	603
18	40 70	632	59	39 90	607	100	39 90	606	141	40 70	609	182	40 60	609	223	39 60	604
19	40 40	629	60	40 10	608	101	39 80	605	142	40 60	608	183	40 50	609	224	39 80	606
20	40 20	627	61	40 20	609	102	39 80	605	143	40 30	607	184	40 50	608	225	40 40	610
21	40 10	625	62	40 40	610	103	39 80	605	144	40 20	607	185	40 40	608	226	40 40	618
22	40 10	625	63	40 80	611	104	39 80	606	145	40 00	606	186	40 30	608	227	40 50	628
23	40 20	624	64	41 00	612	105	40 00	607	146	39 70	605	187	40 30	607	228	40 50	643
24	40 50	624	65	41 00	612	106	40 10	608	147	39 60	604	188	40 30	607	229	40 50	604
25	40 70	624	66	41 10	612	107	40 40	609	148	39 40	603	189	40 20	606	230	40 50	604
26	40 90	623	67	41 10	612	108	40 60	610	149	39 30	602	190	40 10	606	231	40 40	604
27	41 10	622	68	41 10	612	109	40 80	611	150	39 10	601	191	40 10	606	232	40 40	604
28	41 10	621	69	40 90	611	110	41 00	612	151	38 90	600	192	40 00	606	233	40 40	604
29	41 10	620	70	40 80	610	111	41 10	612	152	38 80	600	193	40 00	606	234	39 80	604
30	41 00	619	71	40 70	610	112	41 10	612	153	38 70	599	194	40 00	605	235	39 80	603
31	40 90	617	72	40 60	609	113	41 10	612	154	38 60	600	195	39 90	605	236	39 80	603
32	40 70	616	73	40 40	608	114	41 10	612	155	38 70	601	196	39 80	604	237	39 80	603
33	40 60	615	74	40 20	608	115	41 00	611	156	38 90	601	197	39 70	604	238	39 80	603
34	40 50	614	75	40 10	607	116	40 90	611	157	39 10	602	198	39 60	603	239	39 80	603
35	40 40	613	76	40 10	607	117	40 70	610	158	39 30	603	199	39 50	603	240	39 80	603
36	40 40	613	77	40 00	607	118	40 60	609	159	39 50	604	200	39 50	603			
37	40 30	613	78	39 90	606	119	40 40	608	160	39 70	605	201	39 50	603			
38	40 30	612	79	39 90	606	120	40 30	607	161	39 90	606	202	39 50	603			
39	40 30	612	80	39 90	606	121	40 10	607	162	40 10	606	203	39 50	603			

A.9.4 I.P.: 900 psi, I.T.: 16.8 sec

Time	T	P	40	40 40	645	81	40.00	642	122	40 20	643	163	40 70	646	204	39 90	641
0	42 50	900	41	40 40	645	82	40 00	642	123	40 20	643	164	40 50	645	205	39 90	640
1	43 60	852	42	40 40	646	83	40 00	641	124	40 10	643	165	40 30	644	206	39 80	640
2	43 60	813	43	40 40	646	84	40 00	641	125	40 10	642	166	40 20	643	207	39 80	640
3	43 20	782	44	40 40	646	85	39 90	641	126	40 10	642	167	40 00	642	208	39 70	639
4	42 70	757	45	40 40	646	86	39 90	641	127	40 00	641	168	39 90	642	209	39 60	639
5	42 80	736	46	40 40	646	87	39 90	641	128	39 90	641	169	39 80	642	210	39 50	638
6	42 90	720	47	40 40	646	88	39 80	640	129	39 80	641	170	39 80	641	211	39 50	638
7	42 60	706	48	40 50	645	89	39 80	640	130	39 70	640	171	39 70	641	212	39 40	638
8	42 20	694	49	40 50	645	90	39 70	640	131	39 80	640	172	39 70	641	213	39 50	638
9	41 90	684	50	40 50	645	91	39 70	641	132	39 70	639	173	39 70	641	214	39 40	638
10	41 50	676	51	40 50	645	92	39 80	641	133	39 60	639	174	39 70	641	215	39 50	638
11	41 10	669	52	40 40	645	93	39 90	642	134	39 60	638	175	39 80	641	216	39 50	639
12	40 70	662	53	40 40	644	94	40 00	643	135	39 50	638	176	39 90	642	217	39 60	640
13	40 40	660	54	40 30	644	95	40 10	643	136	39 40	638	177	39 90	642	218	39 90	640
14	40 40	659	55	40 30	644	96	40 30	644	137	39 30	637	178	40 00	642	219	40 00	641
15	40 50	658	56	40 30	643	97	40 40	645	138	39 30	637	179	40 20	643	220	40 00	641
16	40 50	658	57	40 30	643	98	40 50	645	139	39 30	636	180	40 20	643	221	40 20	642
17	40 60	657	58	40 20	643	99	40 50	646	140	39 20	636	181	40 30	643	222	40 20	642
18	40 70	655	59	40 10	642	100	40 60	646	141	39 10	635	182	40 30	644	223	40 30	643
19	40 60	654	60	40 10	642	101	40 70	646	142	39 10	635	183	40 40	644	224	40 40	643
20	40 60	653	61	40 00	642	102	40 80	647	143	39 00	635	184	40 40	644	225	40 40	643
21	40 60	652	62	40 00	642	103	40 80	647	144	38 90	635	185	40 40	644	226	40 50	644
22	40 30	650	63	39 90	641	104	40 80	647	145	38 90	635	186	40 40	644	227	40 50	644
23	40 20	649	64	39 90	641	105	40 80	647	146	39 00	635	187	40 40	644	228	40 50	644
24	40 10	648	65	39 80	640	106	40 80	647	147	39 10	636	188	40 40	644	229	40 50	644
25	40 00	646	66	39 80	640	107	40 80	647	148	39 20	636	189	40 40	644	230	40 50	644
26	39 80	645	67	39 80	640	108	40 80	647	149	39 30	638	190	40 40	644	231	40 50	644
27	39 60	644	68	39 80	640	109	40 80	647	150	39 60	639	191	40 40	644	232	40 50	644
28	39 50	643	69	39 80	641	110	40 80	647	151	39 90	641	192	40 40	644	233	40 50	644
29	39 40	643	70	39 80	641	111	40 70	647	152	40 20	642	193	40 40	644	234	40 40	643
30	39 40	643	71	39 80	641	112	40 70	647	153	40 40	644	194	40 40	644	235	40 40	643
31	39 50	643	72	39 80	641	113	40 70	646	154	40 80	646	195	40 30	643	236	40 30	643
32	39 60	644	73	40 00	641	114	40 70	646	155	40 90	647	196	40 30	643	237	40 30	643
33	39 80	644	74	40 00	642	115	40 60	646	156	41 10	647	197	40 20	643	238	40 20	642
34	39 90	644	75	40 00	642	116	40 50	646	157	41 10	648	198	40 20	642	239	40 20	642
35	40 00	644	76	40 00	642	117	40 50	645	158	41 10	648	199	40 10	642	240	40 10	642
36	40 10	645	77	40 10	642	118	40 50	645	159	41 00	648	200	40 10	642			
37	40 20	645	78	40 00	642	119	40 40	644	160	41 00	647	201	40 10	642			
38	40 30	645	79	40 00	642	120	40 40	644	161	40 90	647	202	40 10	641			
39	40 30	645	80	40 00	642	121	40 30	644	162	40 80	646	203	40 00	641			

A.9.5 I.P.: 950 psi, I.T.: 21.1 sec

Time	T	P	40	40.80	691	81	40.20	685	122	39.80	683	163	39.80	682	204	39.40	681
0	41.80	950	41	40.70	690	82	40.20	685	123	39.80	683	164	39.60	681	205	39.40	681
1	42.30	875	42	40.60	689	83	40.20	685	124	39.70	683	165	39.50	681	206	39.40	681
2	42.00	841	43	40.40	688	84	40.20	685	125	39.70	683	166	39.50	680	207	39.40	681
3	41.60	815	44	40.30	687	85	40.20	685	126	39.80	683	167	39.50	680	208	39.40	681
4	41.10	792	45	40.20	686	86	40.20	685	127	39.80	682	168	39.40	680	209	39.40	681
5	40.80	773	46	40.10	685	87	40.20	685	128	39.80	682	169	39.40	680	210	39.40	681
6	40.90	757	47	39.90	684	88	40.20	685	129	39.80	682	170	39.40	680	211	39.40	681
7	40.80	746	48	39.80	683	89	40.20	684	130	39.80	682	171	39.50	682	212	39.40	681
8	40.70	742	49	39.50	682	90	40.10	684	131	39.80	682	172	39.80	684	213	39.40	681
9	40.80	737	50	39.50	681	91	40.10	685	132	39.80	682	173	40.10	686	214	39.40	681
10	40.90	733	51	39.30	681	92	40.00	683	133	39.70	682	174	40.40	687	215	39.40	681
11	41.00	728	52	39.30	681	93	39.90	682	134	39.70	681	175	40.50	688	216	39.40	681
12	40.90	724	53	39.40	682	94	39.80	681	135	39.70	681	176	40.60	688	217	39.50	681
13	40.80	720	54	39.80	685	95	39.60	681	136	39.70	681	177	40.60	688	218	39.50	681
14	40.70	717	55	40.20	687	96	39.50	680	137	39.70	681	178	40.60	688	219	39.50	681
15	40.50	714	56	40.50	688	97	39.40	679	138	39.70	681	179	40.50	687	220	39.40	681
16	40.40	711	57	40.70	688	98	39.30	679	139	39.60	680	180	40.40	687	221	39.60	682
17	40.20	709	58	40.80	689	99	39.20	678	140	39.60	680	181	40.20	686	222	39.60	682
18	40.20	706	59	40.90	689	100	39.10	678	141	39.60	680	182	40.10	685	223	39.60	682
19	40.00	704	60	40.90	688	101	39.30	679	142	39.50	680	183	40.00	684	224	39.60	682
20	40.00	702	61	40.80	688	102	39.50	681	143	39.50	679	184	39.80	684	225	39.60	682
21	39.90	701	62	40.70	687	103	39.70	683	144	39.50	679	185	39.70	683	226	39.80	682
22	40.00	700	63	40.60	687	104	40.10	685	145	39.40	679	186	39.50	682	227	39.80	682
23	40.30	701	64	40.40	686	105	40.50	687	146	39.40	678	187	39.40	681	228	39.80	682
24	40.60	701	65	40.30	686	106	40.80	688	147	39.30	678	188	39.40	681	229	39.80	682
25	40.80	700	66	40.10	685	107	40.90	688	148	39.20	678	189	39.40	681	230	39.80	682
26	40.80	696	67	40.10	684	108	41.00	689	149	39.20	677	190	39.40	681	231	39.80	682
27	40.50	694	68	39.90	683	109	41.00	689	150	39.40	678	191	39.40	681	232	39.80	682
28	40.40	694	69	39.80	683	110	41.00	689	151	39.60	680	192	39.40	681	233	39.80	682
29	40.30	694	70	39.80	683	111	41.00	689	152	39.70	682	193	39.40	681	234	39.80	682
30	40.40	693	71	39.80	683	112	40.90	689	153	40.10	683	194	39.40	681	235	39.80	682
31	40.50	693	72	39.80	683	113	40.80	688	154	40.20	684	195	39.40	681	236	39.80	682
32	40.60	693	73	39.90	684	114	40.70	688	155	40.40	685	196	39.40	681	237	39.80	682
33	40.70	693	74	39.90	684	115	40.60	687	156	40.40	685	197	39.40	681	238	39.80	682
34	40.90	694	75	40.00	684	116	40.40	687	157	40.50	685	198	39.40	681	239	39.80	682
35	41.00	694	76	40.00	684	117	40.30	686	158	40.40	685	199	39.40	681	240	39.90	682
36	41.00	693	77	40.10	684	118	40.20	685	159	40.30	684	200	39.40	681			
37	41.00	693	78	40.10	684	119	40.10	685	160	40.20	684	201	39.40	681			
38	41.00	693	79	40.10	685	120	40.00	684	161	40.10	683	202	39.40	681			
39	40.90	692	80	40.20	685	121	39.90	684	162	40.00	682	203	39.40	681			

A.10 n-decane at 20 degree of Celsius (Experiment 1)

A.10.1 I.P.: 600 psi, I.T.: 21.0 sec

A.10.2 I.P.: 700 psi, I.T.: 20.2 sec

Time	T	P	40	20 30	350	81	21 10	347	Time	T	P	40	19 80	438	81	20 70	430
0	21 20	600	41	20 30	350	82	21 10	347	0	20 70	700	41	20 00	439	82	20 50	429
1	22 70	538	42	20 30	350	83	21 10	347	1	21 00	602	42	20 20	440	83	20 50	429
2	22 30	501	43	20 40	350	84	21 10	347	2	19 70	553	43	20 50	440	84	20 50	430
3	21 80	473	44	20 30	349	85	21 10	345	3	19 00	524	44	20 70	440	85	20 50	431
4	21 30	451	45	20 30	349	86	21 10	344	4	18 60	505	45	20 90	440	86	20 50	431
5	21 00	436	46	20 30	349	87	20 80	343	5	18 30	492	46	20 90	437	87	20 70	432
6	20 70	427	47	20 30	349	88	20 60	343	6	18 10	483	47	20 70	435	88	20 80	432
7	20 70	419	48	20 30	349	89	20 50	342	7	18 00	476	48	20 30	433	89	20 70	431
8	20 70	413	49	20 30	349	90	20 40	342	8	18 00	471	49	20 20	433	90	20 60	431
9	20 70	408	50	20 40	349	91	20 30	342	9	17 90	467	50	20 10	433	91	20 60	431
10	20 80	402	51	20 40	349	92	20 20	342	10	17 90	463	51	20 10	432	92	20 60	431
11	20 70	394	52	20 40	349	93	20 20	342	11	17 90	459	52	20 10	433	93	20 70	432
12	20 70	388	53	20 40	348	94	20 20	342	12	17 90	456	53	20 10	433	94	20 80	433
13	20 60	383	54	20 40	348	95	20 10	342	13	18 00	454	54	20 30	433	95	20 90	432
14	20 50	380	55	20 50	348	96	20 20	342	14	18 00	452	55	20 40	434	96	20 70	430
15	20 40	377	56	20 40	348	97	20 10	342	15	18 00	450	56	20 50	434	97	20 50	430
16	20 50	374	57	20 40	348	98	20 00	342	16	18 10	448	57	20 60	434	98	20 40	430
17	20 40	371	58	20 50	348	99	20 10	342	17	18 10	447	58	20 60	435	99	20 40	430
18	20 40	369	59	20 50	348	100	20 10	342	18	18 20	446	59	20 80	435	100	20 60	431
19	20 40	367	60	20 50	348	101	20 10	342	19	18 20	445	60	20 90	434	101	20 70	432
20	20 30	366	61	20 50	348	102	20 10	342	20	18 20	444	61	20 70	433	102	20 80	433
21	20 30	364	62	20 60	348	103	20 10	342	21	18 30	443	62	20 60	432	103	21 00	434
22	20 40	363	63	20 60	348	104	20 10	342	22	18 40	442	63	20 50	431	104	21 20	435
23	20 40	362	64	20 60	348	105	20 10	342	23	18 50	441	64	20 50	431	105	21 40	435
24	20 40	360	65	20 60	348	106	20 20	342	24	18 50	440	65	20 40	431	106	21 30	434
25	20 40	359	66	20 60	348	107	20 20	342	25	18 50	440	66	20 40	431	107	21 10	432
26	20 40	358	67	20 60	348	108	20 30	342	26	18 60	439	67	20 40	431	108	20 80	430
27	20 40	357	68	20 70	348	109	20 50	343	27	18 60	438	68	20 40	431	109	20 40	428
28	20 40	357	69	20 70	348	110	20 50	343	28	18 60	438	69	20 40	432	110	20 20	427
29	20 30	356	70	20 80	348	111	20 50	343	29	18 80	437	70	20 50	432	111	20 10	427
30	20 40	355	71	20 80	348	112	20 50	343	30	18 80	437	71	20 60	432	112	20 00	427
31	20 40	354	72	20 90	348	113	20 60	343	31	18 80	437	72	20 60	433	113	20 00	429
32	20 30	354	73	21 00	348	114	20 60	343	32	18 90	436	73	20 80	433	114	20 20	429
33	20 40	353	74	21 00	347	115	20 60	343	33	19 00	436	74	20 90	434	115	20 30	430
34	20 30	352	75	21 10	347	116	20 60	343	34	19 10	436	75	20 90	434	116	20 40	430
35	20 30	352	76	21 10	347	117	20 60	342	35	19 20	437	76	21 10	435	117	20 40	430
36	20 40	352	77	21 10	347	118	20 60	342	36	19 20	437	77	21 20	435	118	20 40	428
37	20 40	351	78	21 10	347	119	20 60	342	37	19 40	437	78	21 30	435	119	20 20	427
38	20 30	351	79	21 10	347	120	20 60	342	38	19 50	437	79	21 40	435	120	20 00	427
39	20 30	351	80	21 10	347	81	21 10	347	39	19 70	438	80	21 10	432			

A.10.3 I.P.: 800 psi, I.T.: 25.4 sec

Time	T	P	40	20 40	518	81	20 30	515
0	21.10	800	41	20 60	518	82	20 30	516
1	20.90	652	42	20 80	520	83	20 30	516
2	19.80	612	43	21 10	521	84	20 30	516
3	20.10	584	44	21 30	523	85	20 30	516
4	19.80	567	45	21 60	524	86	20 30	516
5	19.40	556	46	21 60	526	87	20 20	516
6	19.20	548	47	21 30	528	88	20 10	515
7	19.10	543	48	20 80	526	89	20 10	515
8	19.00	539	49	20 40	523	90	20 00	514
9	18.90	537	50	20 40	519	91	19 90	513
10	18.90	534	51	20 70	516	92	19 90	513
11	18.90	533	52	20 90	519	93	19 90	513
12	19.00	532	53	21 20	520	94	19 90	513
13	19.00	531	54	21 30	522	95	20 00	513
14	19.10	530	55	21 20	524	96	20 00	514
15	19.10	529	56	20 90	525	97	20 00	514
16	19.30	528	57	20 50	523	98	20 00	514
17	19.30	528	58	20 20	521	99	20 00	514
18	19.40	527	59	19 90	518	100	20 00	514
19	19.40	527	60	19 70	516	101	20 00	514
20	19.60	527	61	19 50	514	102	20 00	514
21	19.70	527	62	19 40	512	103	20 00	514
22	19.90	527	63	19 60	511	104	20 10	515
23	20.40	530	64	20 00	512	105	20 20	515
24	20.60	531	65	20 40	514	106	20 20	515
25	20.90	531	66	20 80	517	107	20 30	515
26	21.10	532	67	20 90	519	108	20 30	515
27	21.30	533	68	21 00	522	109	20 30	515
28	21.60	534	69	20 90	522	110	20 30	516
29	21.60	531	70	20 70	522	111	20 30	516
30	21.40	527	71	20 60	521	112	20 30	516
31	21.00	526	72	20 50	519	113	20 30	516
32	21.20	526	73	20 50	518	114	20 20	516
33	21.30	526	74	20 40	517	115	20 40	516
34	21.40	527	75	20 30	517	116	20 40	516
35	21.20	528	76	20 40	516	117	20 40	516
36	20.70	527	77	20 40	516	118	20 40	516
37	20.40	524	78	20 30	516	119	20 40	516
38	20.20	520	79	20 30	516	120	20 40	516
39	20.30	518	80	20 30	516			

A.10.4 I.P.: 825 psi, I.T.: 20.3 sec

Time	T	P	40	20.10	529	81	21.10	537
0	22 00	825	41	20 20	531	82	21 30	539
1	22 20	691	42	20 40	532	83	21 50	541
2	21 40	644	43	20 60	533	84	21 80	543
3	21 00	615	44	20 80	534	85	22 10	545
4	20 70	595	45	20 60	531	86	22 30	546
5	20 60	582	46	20 20	528	87	22 50	548
6	20 50	573	47	20 10	527	88	22 80	550
7	20 50	566	48	20 00	528	89	23 00	552
8	20 50	561	49	20 10	529	90	23 20	553
9	20 50	557	50	20 20	530	91	23 30	554
10	20 40	547	51	20 40	532	92	23 30	553
11	20 00	539	52	20 60	534	93	22 80	548
12	19 70	536	53	20 80	535	94	22 30	544
13	19 60	533	54	20 70	533	95	21 80	540
14	19 60	532	55	20 40	529	96	21 30	536
15	19 60	532	56	20 10	528	97	20 90	533
16	19 70	532	57	20 00	528	98	20 60	531
17	19 80	532	58	20 00	530	99	20 40	530
18	20 00	532	59	20 20	531	100	20 30	528
19	20 10	533	60	20 40	532	101	20 10	527
20	20 30	534	61	20 70	534	102	20 00	526
21	20 40	534	62	20 70	534	103	19 90	525
22	20 60	535	63	20 50	531	104	19 80	525
23	20 70	536	64	20 30	530	105	19 80	525
24	20 80	537	65	20 30	531	106	19 70	525
25	21 00	538	66	20 50	532	107	19 80	526
26	21 10	539	67	20 70	534	108	20 10	529
27	21 20	538	68	20 90	535	109	20 50	532
28	20 90	534	69	21 20	537	110	20 90	535
29	20 40	531	70	21 40	539	111	21 20	537
30	20 20	530	71	21 60	541	112	21 20	536
31	20 10	530	72	21 80	542	113	20 90	530
32	20 10	530	73	22 00	544	114	20 30	526
33	20 20	531	74	22 20	546	115	19 70	521
34	20 40	532	75	22 30	545	116	19 30	519
35	20 50	533	76	22 00	542	117	19 00	518
36	20 40	530	77	21 50	539	118	19 00	519
37	20 10	528	78	21 10	535	119	19 10	520
38	20 00	528	79	20 90	535	120	19 30	523
39	19 90	528	80	20 90	536			

A.10.5 I.P.: 850 psi, I.T.: 22.6 sec

A.10.6 I.P.: 875 psi, I.T.: 25.7 sec

Time	T	P	40	20 30	567	81	20 10	568	Time	T	P	40	21 70	623	81	20.40	606
0	22.60	850	41	20.20	568	82	20.40	570	0	22.30	875	41	21.80	625	82	20.30	604
1	22.30	705	42	20.30	569	83	20.70	572	1	22.70	714	42	22.00	627	83	20.00	603
2	21.60	659	43	20.40	569	84	20.90	575	2	22.10	678	43	22.00	623	84	20.00	602
3	21.30	634	44	20.30	567	85	21.20	577	3	21.60	655	44	21.60	619	85	19.90	602
4	21.00	618	45	20.20	566	86	21.50	579	4	20.80	632	45	21.20	614	86	19.80	601
5	20.80	607	46	20.20	567	87	21.40	577	5	20.10	620	46	20.80	610	87	19.80	601
6	20.70	600	47	20.30	569	88	21.10	573	6	19.70	612	47	20.50	607	88	19.70	601
7	20.70	595	48	20.60	571	89	20.70	570	7	19.50	608	48	20.20	604	89	19.70	600
8	20.60	586	49	20.90	574	90	20.30	566	8	19.40	606	49	20.10	602	90	19.70	601
9	20.20	578	50	21.10	576	91	19.90	563	9	19.40	605	50	20.10	604	91	19.80	604
10	19.90	574	51	21.40	578	92	19.70	562	10	19.50	605	51	20.20	606	92	20.10	607
11	19.80	572	52	21.70	581	93	19.70	563	11	19.60	605	52	20.30	608	93	20.40	610
12	19.80	571	53	21.90	583	94	19.90	565	12	19.80	606	53	20.60	611	94	20.60	611
13	19.80	570	54	22.10	585	95	20.20	568	13	19.90	608	54	20.90	614	95	20.60	610
14	19.90	571	55	22.40	587	96	20.50	570	14	20.10	609	55	21.10	617	96	20.60	610
15	20.10	571	56	22.60	590	97	20.80	573	15	20.30	610	56	21.40	619	97	20.50	608
16	20.20	572	57	22.80	591	98	21.20	576	16	20.40	612	57	21.50	622	98	20.30	605
17	20.30	572	58	22.80	589	99	21.40	579	17	20.60	614	58	21.60	621	99	20.10	603
18	20.60	573	59	22.50	586	100	21.70	581	18	20.80	615	59	21.50	617	100	19.90	602
19	20.70	575	60	22.00	580	101	21.30	579	19	20.70	610	60	21.30	614	101	19.70	600
20	20.70	571	61	21.30	572	102	20.50	570	20	20.40	606	61	20.90	611	102	19.60	599
21	20.40	568	62	20.50	566	103	19.90	563	21	20.10	605	62	20.70	609	103	19.60	599
22	20.20	568	63	19.90	561	104	19.60	562	22	20.10	606	63	20.40	607	104	19.50	598
23	20.10	568	64	19.60	560	105	19.50	562	23	20.10	607	64	20.30	606	105	19.40	598
24	20.10	568	65	19.50	561	106	19.50	563	24	20.20	608	65	20.20	604	106	19.40	598
25	20.30	569	66	19.50	562	107	19.70	563	25	20.40	610	66	20.20	603	107	19.50	600
26	20.40	571	67	19.70	563	108	20.00	568	26	20.60	612	67	20.10	605	108	19.70	602
27	20.60	572	68	20.00	565	109	20.10	568	27	20.70	611	68	20.30	607	109	19.90	605
28	20.80	573	69	20.10	567	110	20.40	570	28	20.40	606	69	20.50	610	110	20.30	608
29	20.90	573	70	20.40	569	111	20.60	570	29	20.10	602	70	20.80	613	111	20.50	611
30	20.60	569	71	20.60	571	112	20.90	573	30	19.90	602	71	21.00	616	112	20.70	614
31	20.30	566	72	20.90	573	113	20.60	571	31	19.90	603	72	21.30	619	113	20.80	612
32	20.10	565	73	21.10	575	114	20.20	569	32	20.00	605	73	21.50	621	114	20.70	610
33	20.10	566	74	21.20	574	115	20.30	570	33	20.20	607	74	21.60	621	115	20.50	608
34	20.20	568	75	20.90	571	116	20.60	571	34	20.30	609	75	21.50	619	116	20.30	606
35	20.30	569	76	20.40	567	117	20.90	573	35	20.60	611	76	21.30	617	117	20.20	605
36	20.60	571	77	20.00	563	118	20.60	571	36	20.80	614	77	21.10	615	118	20.00	604
37	20.80	573	78	19.80	563	119	20.40	569	37	20.90	616	78	21.00	613	119	19.90	603
38	20.80	572	79	19.70	564	120	20.10	568	38	21.10	618	79	20.90	611	120	19.80	602
39	20.60	569	80	19.80	566	81	20.10	568	39	21.40	621	80	20.60	608			

A.10.7 I.P.: 900 psi, I.T.: 22.3 sec

Time	T	P	40	19 90	601	81	20 20	608
0	22.00	900	41	19 50	599	82	20 40	609
1	23 50	739	42	19 40	599	83	20 50	609
2	22.70	688	43	19 30	600	84	20 50	608
3	21.80	662	44	19 40	601	85	20 40	608
4	21 00	646	45	19 50	603	86	20 40	607
5	20 40	636	46	19 60	605	87	20 40	607
6	20 10	629	47	19 90	607	88	20 30	607
7	19 90	625	48	20 00	608	89	20 30	608
8	19 90	621	49	20 20	610	90	20 40	608
9	19 80	618	50	20 40	612	91	20 40	609
10	19 70	616	51	20 60	614	92	20 50	609
11	19 80	615	52	20 80	616	93	20 50	609
12	19 80	614	53	21 00	618	94	20 20	602
13	19 80	614	54	21 10	620	95	19 60	596
14	19 80	614	55	21 30	622	96	19 20	592
15	19 90	613	56	21 30	618	97	18 80	589
16	20 00	614	57	20 90	613	98	18 50	586
17	20 10	614	58	20 50	608	99	18 40	585
18	20 10	614	59	20 10	604	100	18 20	583
19	20 20	615	60	19 70	601	101	18 10	582
20	20 20	612	61	19 50	598	102	18 00	582
21	20 10	606	62	19 40	596	103	17 90	584
22	19 70	602	63	19 20	596	104	18 10	587
23	19 40	601	64	19 30	598	105	18 30	590
24	19 20	600	65	19 40	601	106	18 60	592
25	19 10	600	66	19 70	604	107	18 90	595
26	19 20	600	67	20 00	607	108	19 10	598
27	19 20	601	68	20 30	609	109	19 30	601
28	19 30	602	69	20 50	612	110	19 60	603
29	19 50	603	70	20 80	615	111	19 80	606
30	19 60	604	71	21 00	616	112	20 00	608
31	19 70	605	72	21 00	614	113	20 20	611
32	19 90	606	73	20 70	611	114	20 50	613
33	20 00	608	74	20 50	608	115	20 70	615
34	20 10	609	75	20 20	606	116	20 90	618
35	20 20	610	76	20 10	604	117	21 10	620
36	20 40	611	77	19 90	603	118	20 90	618
37	20 50	612	78	19 90	602	119	20 70	615
38	20 60	611	79	19 80	603	120	20 50	613
39	20 30	606	80	20 00	605	81	20 20	608

A.10.8 I.P.: 950 psi, I.T.: 31.6 sec

Time	T	P	40	20 20	646	81	19 20	629
0	23 60	950	41	20 60	649	82	19 20	630
1	25 10	768	42	20 80	652	83	19 40	631
2	24 40	714	43	21 00	654	84	19 50	633
3	23 00	691	44	21 30	657	85	19 70	634
4	22 20	676	45	21 50	660	86	19 90	636
5	21 40	666	46	21 70	663	87	20 00	638
6	21 00	659	47	22 00	666	88	20 20	640
7	20 80	655	48	22 10	667	89	20 40	642
8	20 60	652	49	22 20	666	90	20 50	645
9	20 60	650	50	21 90	663	91	20 70	647
10	20 50	648	51	21 70	661	92	20 90	649
11	20 50	648	52	21 40	659	93	21 00	649
12	20 60	647	53	21 20	657	94	21 00	646
13	20 60	647	54	21 00	656	95	20 70	641
14	20 50	644	55	20 90	655	96	20 20	637
15	20 40	643	56	20 80	654	97	19 80	633
16	20 30	642	57	20 70	654	98	19 50	632
17	20 30	642	58	20 70	653	99	19 40	633
18	20 30	643	59	20 70	653	100	19 40	635
19	20 30	645	60	20 70	653	101	19 60	637
20	20 40	646	61	20 70	653	102	19 90	640
21	20 60	647	62	20 70	653	103	20 10	643
22	20 80	648	63	20 70	653	104	20 40	646
23	20 80	647	64	20 70	654	105	20 60	647
24	20 70	645	65	20 80	654	106	20 60	645
25	20 40	642	66	20 80	654	107	20 50	642
26	20 10	640	67	20 80	654	108	20 20	640
27	20 00	640	68	20 80	655	109	19 90	638
28	20 00	641	69	20 90	656	110	19 70	637
29	20 00	643	70	20 90	656	111	19 50	636
30	20 20	645	71	20 90	655	112	19 50	635
31	20 50	647	72	20 80	651	113	19 40	634
32	20 70	648	73	20 60	649	114	19 40	635
33	20 70	647	74	20 30	647	115	19 60	638
34	20 60	646	75	20 10	645	116	19 80	641
35	20 30	644	76	20 00	644	117	20 10	644
36	20 20	643	77	19 90	642	118	20 40	647
37	20 00	642	78	19 80	635	119	20 50	646
38	19 90	642	79	19 50	631	120	20 50	644
39	20 00	644	80	19 30	629			

A. 11 Table summary of raw data

Table 11.1 Crude oil at 30 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
500	156	30.22	0.40	17.20
600	189	30.42	0.40	19.10
700	232	30.27	0.44	15.60
800	248	30.21	0.35	19.30
850	262	30.52	0.32	24.50
900	260	30.26	0.50	33.80
950	244	30.45	0.37	18.20
	AVE	30.32	0.40	21.58
	SD	0.13	0.06	6.70

Table 11.2 Crude oil at 30 degree of Celsius (Experiment 2)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
500	168	30.62	0.61	22.30
600	193	30.30	0.31	23.10
700	236	30.00	0.59	18.20
800	263	30.33	0.58	23.20
850	278	30.46	0.23	24.00
900	282	30.61	0.50	24.10
925	273	30.33	0.64	19.20
950	249	30.39	0.50	25.20
	AVE	30.39	0.47	22.48
	SD	0.23	0.16	2.20

Table 11.3 Crude oil at 30 degree of Celsius (Experiment 3)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
700	255	30.66	0.65	23.60
800	282	30.06	0.35	21.2
850	295	30.43	0.44	26.70
900	292	30.11	0.27	23.10
950	251	30.28	0.56	25.00
	AVE	30.31	0.45	23.92
	SD	0.25	0.16	2.07

Table 11.4 n-pentane at 30 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
400	171	30.35	0.26	15.00
500	204	30.06	0.49	23.50
600	268	30.35	0.31	23.20
650	309	30.31	0.39	16.60
675	317	30.33	0.40	24.50
700	306	30.14	0.60	22.40
725	333	30.31	0.52	18.00
750	342	30.57	0.43	21.10
800	347	30.56	0.72	30.20
900	366	30.49	0.89	24.70
	AVE	30.30	0.42	20.54
	SD	0.15	0.11	3.54

Table 11.5 n-pentane at 30 degree of Celsius (Experiment 2)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
500	212	30.29	0.40	20.20
600	281	30.37	0.47	19.40
650	295	30.34	0.41	22.40
685	333	30.50	0.43	11.70
700	318	30.51	0.45	17.00
750	344	30.53	0.52	18.80
	AVE	30.42	0.44	18.25
	SD	0.10	0.04	3.66

Table 11.6 n-heptane at 30 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
500	232	30.36	0.40	21.20
600	279	30.60	0.42	17.40
650	305	30.42	0.37	21.00
700	317	30.17	0.32	18.40
750	328	30.45	0.49	25.70
775	337	30.18	0.59	19.60
800	335	30.47	0.59	27.70
825	323	30.26	0.46	27.60
850	358	30.34	0.74	17.70
900	359	30.35	0.87	25.10
	AVE	30.38	0.46	21.57
	SD	0.16	0.10	3.80

Table 11.7 n-heptane at 30 degree of Celsius (Experiment 2)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
600	265	30.49	0.61	21.30
650	296	30.38	0.59	16.50
700	317	30.27	0.56	22.00
750	333	30.39	0.57	18.60
775	335	30.36	0.52	20.50
800	341	30.15	0.55	20.30
825	334	30.57	0.48	25.90
	AVE	30.34	0.57	19.87
	SD	0.12	0.03	2.01

Table 11.8 n-heptane at 40 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
600	238	40.32	0.59	22.30
650	262	40.14	0.59	23.30
700	281	40.22	0.62	13.00
750	293	40.32	0.64	26.80
800	304	40.21	0.57	21.10
850	310	40.27	0.86	20.50
910	324	40.25	0.70	22.60
930	295	40.00	0.64	24.90
950	282	40.38	0.73	18.40
	AVE	40.23	0.66	21.43
	SD	0.12	0.09	4.00

Table 11.9 crude oil API 62.1 at 40 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
700	208	40.68	0.68	25.00
800	236	40.52	0.73	22.30
850	247	40.35	0.65	27.90
900	258	40.24	0.71	16.8
950	268	40.03	0.57	21.10
	AVE	40.36	0.67	22.62
	SD	0.25	0.06	4.18

Table 11.10 n-decane at 20 degree of Celsius (Experiment 1)

Initial pressure (psi)	Total pressure drop (psi)	Temperature (°C)	SD	Injection Time (sec)
600	258	20.57	0.40	21.00
700	273	19.94	1.04	20.20
800	286	20.29	0.65	25.40
825	299	20.71	0.92	20.3
850	282	20.60	0.75	22.60
875	271	20.48	0.70	25.70
900	292	20.01	0.86	22.30
950	312	20.57	0.91	31.60
	AVE	20.40	0.78	23.64
	SD	0.29	0.20	3.85

A. 12 Data of Crude Oil

API gravity: 62.1

Specific gravity: 0.7301

Average molecular weight: 154

MW_{C7+}: 145.19

Mol% of C₁: 0

Mol% of C₂-C₆: 9.19

Mol% of C₇₊: 90.81

GCMS testing condition

Column: HP5-MS 30 m x 0.25 μ m x 0.25 μ m

Carrier gas: Helium, constant flow 1.2 mL/min

Split/splitless inlet: 340 °C, split 30:1

Oven: 50 °C (1min) \rightarrow 320 C at 5 °C/min, hold for 20 minutes

Analysis time: 74 min

Sample: Crude oil in CS₂, 1 μ L injection

MSD: Scan = 35-700 u, Samples = 2², Source = 300 °C, Quad = 150 °C,

Transfer line = 320 °C

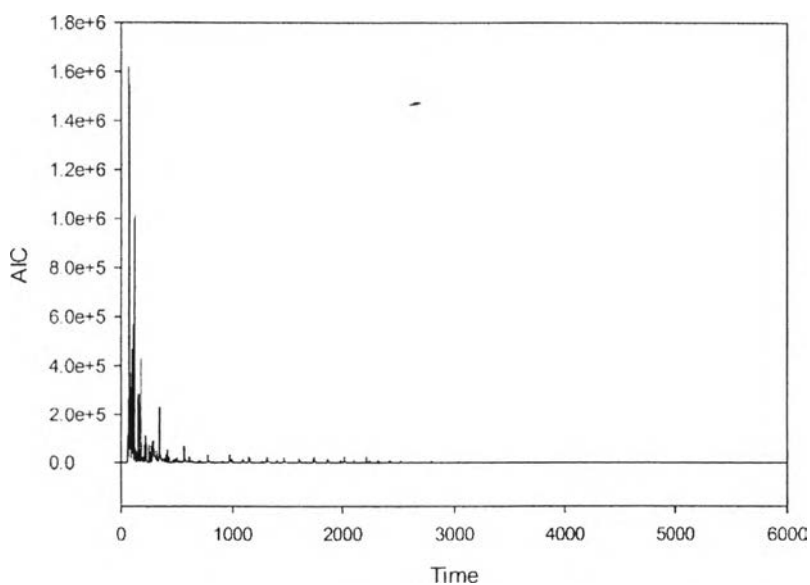


Figure 1. GCMS chromatogram of crude oil API 62.1

Table 12.1 GCMS results

Peak #	Name	Formula	R.T. (s)	%Area	Molecular Weight
1	3-Cyclopropylcarbonyloxytridecane	C17H32O2	5.75	0.276758759	268
2	Acetamide, 2,2,2-trifluoro-	C2H2F3NO	59.05	0.111705817	113
3	Carbonyl sulfide	COS	59.65	1.354686617	60
4	Butane, 2,3-dimethyl-	C6H14	64.25	3.594496097	86
5	Unknown 2	C15H13NO5	66.55	0.109454621	287
6	2-Butenedinitrile, (E)-	C4H2N2	69.05	0.031500704	78
9	Hexane	C6H14	76.35	0.92106582	86
10	Thiourea	CH4N2S	82.1	0.743536081	76
11	Cyclopentane, methyl-	C6H12	83.55	2.046122451	84
12	Hexane, 2-methyl-	C7H16	93	0.644948541	100
13	1-Pentene, 2-methyl-	C6H12	93.5	0.287784206	84
14	Pentane, 2,3,4-trimethyl-	C8H18	96.25	0.88127398	114
15	Cyclopentane, 1,3-dimethyl-, cis-	C7H14	103.05	0.454428822	98
16	Cyclobutanone, 2,3-dimethyl-, cis-	C6H10O	103.1	0.111513373	98
17	Heptane	C7H16	105.8	5.129238282	100
18	Cyclopentane, 1,1,2-trimethyl-	C8H16	119.95	0.136150235	112
19	Cyclohexane, methyl-	C7H14	120.55	4.449870301	98
20	Hexane, 2,5-dimethyl-	C8H18	120.9	1.050384287	114
21	2(3H)-Furanone, 5-acetyldihydro-	C6H8O3	122.5	0.104296717	128
22	Cyclopentane, ethyl-	C7H14	126	0.133259563	98
23	Pentane, 2,3,3-trimethyl-	C8H18	128.45	0.184082863	114
24	1-Heptene, 3-methyl-	C8H16	134.5	0.201244472	112
25	Hexane, 2,3-dimethyl-	C8H18	141.25	0.197275311	114
26	Heptane, 2-methyl-	C8H18	145.25	2.124102428	114
27	Pentane, 3-ethyl-	C7H16	145.85	0.692738841	100
28	3-Heptene, 2-methyl-, (E)-	C8H16	147.05	0.103005737	112
29	1,3,5-Cycloheptatriene	C7H8	149.85	1.122610986	92
30	Heptane, 3-methyl-	C8H18	151.5	0.524891449	114
31	1,3-Dimethylcyclohexane,c&t	C8H16	160.05	0.144158718	112
32	Cyclohexane, 1,1-dimethyl-	C8H16	168.1	0.238570621	112
33	Octane	C8H18	177.25	6.68001748	114
34	Cyclohexane, 1,2-dimethyl-	C8H16	179.9	0.517875256	112
35	Cyclohexane, 1,3-dimethyl-, trans-	C8H16	187	0.343472735	112
36	Hexane, 2,3,5-trimethyl-	C9H20	192.95	0.031879578	128
37	Heptane, 2,4-dimethyl-	C9H20	202	0.067748363	128
38	Heptane, 2,6-dimethyl-	C9H20	211.95	0.850041897	128
39	Cyclohexane, 1,2-dimethyl-, cis-	C8H16	217.8	0.044418518	112
40	Cyclohexane, 1,3,5-trimethyl-, (1à,3à,5à)-	C9H18	219.55	0.042163313	126
41	Heptane, 3,5-dimethyl-	C9H20	220.65	1.247519274	128
42	Cyclohexane, ethyl-	C8H16	223.1	0.802692615	112
43	2,2'-Bifuran, octahydro-	C8H14O2	224.2	0.053282977	142
44	Cyclohexane, 1,1,3-trimethyl-	C9H18	228.45	0.416120406	126

Peak #	Name	Formula	R.T. (s)	%Area	Molecular Weight
45	1,1,4-Trimethylcyclohexane	C9H18	233.7	0.063003412	126
46	Cyclohexane, 1,3,5-trimethyl-	C9H18	253.55	0.207899833	126
47	Heptane, 2,3-dimethyl-	C9H20	254.4	0.82951452	128
48	Heptane, 4-ethyl-	C9H20	260.9	0.115731107	128
49	Octane, 4-methyl-	C9H20	267.95	0.121049382	128
50	Octane, 2-methyl-	C9H20	271.45	0.350468882	128
51	4-Hexen-1-ol, acetate, (Z)-	C8H14O2	279.85	0.181045854	142
52	Octane, 3-methyl-	C9H20	284	1.663920328	128
53	o-Xylene	C8H10	291.5	2.406554327	106
54	1-Decene, 9-methyl-	C11H22	296.6	0.107454004	154
55	5-Undecene, 7-methyl-, (E)-	C12H24	311.55	0.149903978	168
56	1-Ethyl-4-methylcyclohexane	C9H18	320.75	0.372419544	126
57	Cyclohexane, 1-ethyl-4-methyl-, cis-	C9H18	328.35	0.453145861	126
58	Cyclopentene, 1-ethenyl-3-methylene-	C8H10	329.5	0.091795865	106
59	Nonane	C9H20	346.2	5.201003917	128
60	4-Nonene, 2,3,3-trimethyl-, (Z)-	C12H24	358.65	0.023859067	168
61	Cyclohexane, 1-ethyl-4-methyl-, cis-	C9H18	361.7	0.163064353	126
62	Unknown 3	C23H48	365.8	0.262325447	324
63	Cyclohexane, 1-ethyl-4-methyl-, cis-	C9H18	369.8	0.047591842	126
64	Oxalic acid, heptyl propyl ester	C12H22O4	377.35	0.128584774	230
65	Hexane, 2,3,5-trimethyl-	C9H20	381.4	0.071661394	128
66	Pentane, 3-methyl-	C6H14	383.3	0.151658027	86
67	Pentalene, octahydro-2-methyl-	C9H16	387.8	0.180458498	124
68	Cyclohexane, (1-methylethyl)-	C9H18	389.7	0.132960874	126
69	Hexane, 4-ethyl-2-methyl-	C9H20	398.25	0.290330082	128
70	Cyclohexane, (1-methylethyl)-	C9H18	412.55	0.311779587	126
71	Octane, 2,6-dimethyl-	C10H22	420.5	0.765446651	142
72	1-Trifluoroacetoxy-2-methylpentane	C8H13F3O2	431.75	0.095187693	198
73	Heptane, 4-(1-methylethyl)-	C10H22	432.2	0.432558345	142
74	Unknown 4	C27H54	436.95	0.056003256	378
75	Octane, 4-ethyl-	C10H22	466.1	0.411670135	142
76	1-Hexene, 3,3,5-trimethyl-	C9H18	471.25	0.069468333	126
77	Oxalic acid, hexyl propyl ester	C11H20O4	478.35	0.040389218	216
78	1-Hexene, 3,5,5-trimethyl-	C9H18	483.15	0.431175152	126
79	Nonane, 2-methyl-	C10H22	491.05	0.559491306	142
80	Benzene, (1-methylethyl)-	C9H12	499.8	0.372940747	120
81	Nonane, 3-methyl-	C10H22	505.05	0.504243795	142
82	Cyclohexane, 1-methyl-4-(1-methylethyl)-, cis-	C10H20	505.7	0.215176628	140
83	9-Methylbicyclo[3.3.1]nonane	C10H18	507	0.10607883	138
84	Benzene, (1-methylethyl)-	C9H12	518.15	0.073192929	120
85	Cyclohexane, 1-isopropyl-3-methyl-, trans-	C10H20	531.1	0.127566423	140
86	Cyclohexane, (3-methylpentyl)-	C12H24	534.35	0.053100556	168
87	Cyclohexane, 1-ethyl-1-methyl-	C9H18	539.55	0.111705817	126

Peak #	Name	Formula	R.T. (s)	%Area	Molecular Weight
88	Benzene, 1-ethyl-3-methyl-	C9H12	553.95	0.428749554	120
89	Decane	C10H22	570.8	3.634989556	142
90	Oxalic acid, allyl octyl ester	C13H22O4	593.25	0.068391848	242
91	Heptane, 2,5-dimethyl-	C9H20	609.1	0.190708154	128
92	Benzene, 1-ethyl-3-methyl-	C9H12	610.7	0.202948405	120
93	Heptadecane, 9-hexyl-	C23H48	617.2	0.408943842	324
94	Oxalic acid, allyl nonyl ester	C14H24O4	627.05	0.086890543	256
95	Cyclohexane, (1-methylethyl)-	C9H18	635.85	0.143507215	126
96	Decane, 3-methyl-	C11H24	644	0.139495957	156
97	Unknown 5	C28H43NO6	651.35	0.07311074	489
98	1,1'-Bicyclopentyl	C10H18	685.5	0.094295634	138
99	Decane, 5-methyl-	C11H24	690.5	0.115682996	156
100	Octane, 3-ethyl-	C10H22	698	0.067561933	142
101	Octane	C8H18	707.25	0.364100344	114
102	Decane, 3-methyl-	C11H24	719.3	0.185504144	156
103	1-Methyl-4-(1-methylethyl)-cyclohexane	C10H20	745.3	0.09751306	140
104	Undecane	C11H24	780.5	3.904010456	156
105	trans-Decalin, 2-methyl-	C11H20	799.65	0.059220681	152
106	1-Undecyne	C11H20	829.45	0.069785064	152
107	Unknown 6	C16H34	830.1	0.044448587	226
108	Cyclohexane, octyl-	C14H28	844.65	0.06548113	196
109	Oxalic acid, allyl heptyl ester	C12H20O4	883.7	0.138046612	228
110	Undecane, 2-methyl-	C12H26	903.15	0.236385578	170
111	Octane, 2,7-dimethyl-	C10H22	914.4	0.115538663	142
112	Dodecane	C12H26	970.6	1.233426749	170
113	Undecane, 2,6-dimethyl-	C13H28	992.05	0.621835196	184
114	Dodecane, 2-methyl-	C13H28	1082.25	0.139590174	184
115	Octane, 2,3,7-trimethyl-	C11H24	1094.85	0.480709477	156
116	Tridecane	C13H28	1144.9	3.211612401	184
117	Decane, 2,5,9-trimethyl-	C13H28	1265	0.249596068	184
118	Hexadecane	C16H34	1306.65	2.988096527	226
119	1H-Indene, octahydro-2,2,4,4,7,7-hexamethyl-, trans-	C15H28	1337.85	0.052535251	208
120	Decane, 2,3,5,8-tetramethyl-	C14H30	1396.25	0.280026301	198
121	Octane, 2-bromo-	C8H17Br	1402.85	0.173287949	192
122	Pentadecane	C15H32	1458.05	2.833138885	212
123	Hexadecane	C16H34	1600.85	2.307726232	226
124	Pentadecane	C15H32	1662.8	0.348684764	212
125	Dodecane, 2,7,10-trimethyl-	C15H32	1736.95	3.064873729	212
126	Hexadecane	C16H34	1864.4	1.751743023	226
127	Dodecane, 2-methyl-	C13H28	1986.6	1.197964903	184
128	Tridecanoic acid, methyl ester	C14H28O2	2017.2	2.366461794	228
129	Dodecane, 5,8-diethyl-	C16H34	2103.25	1.035690373	226
130	9-Octadecenoic acid (Z)-, methyl ester	C19H36O2	2213.9	0.677383401	296

Peak #	Name	Formula	R.T. (s)	%Area	Molecular Weight
131	1-Iodo-2-methylundecane	C12H25I	2214.6	1.370222473	296
132	Tridecanoic acid, methyl ester	C14H28O2	2244.45	0.647173677	228
133	Heptacosane	C27H56	2321.75	0.768473637	380
134	Nonadecane, 2-methyl-	C20H42	2424.25	0.717255426	282
135	Octadecane, 2-methyl-	C19H40	2522.65	0.57869563	268
136	Heptacosane	C27H56	2617.15	0.508894529	380
137	Heptacosane	C27H56	2708.35	0.441178239	380
138	Octane, 2,7-dimethyl-	C10H22	2796.05	0.405415699	142
139	Hexadecane	C16H34	2880.85	0.325431095	226
140	Hexadecane	C16H34	2962.7	0.060275115	226
141	Tridecane, 3-methyl-	C14H30	3041.7	0.223175088	198
142	Nonadecane, 2-methyl-	C20H42	3118.35	0.184167058	282
143	Dodecane, 3-methyl-	C13H28	3192.45	0.112674052	184
Total	Total			99.9996953	

APPENDIX B: Laboratory Instrument

B.1 Parr reactor model 4576A high temperature/high pressure and Reactor controller model 4848

Table B.1 Specification of Parr reactor

Reactor sizes (mL)	250
Maximum pressure (psi)	5000
Maximum temperature (°C)	500

Parr reactor model 4576A is available to use in many laboratory. The high pressure/high temperature reactor is mostly use in the petroleum work. Inside the reactor included the cooling coil and magnetic stirrer motor. The equipment of Parr reactor system are included pressure gauge, magnetic stirrer motor, thermocouple, ceramic heater that are show in Fig. B.1.

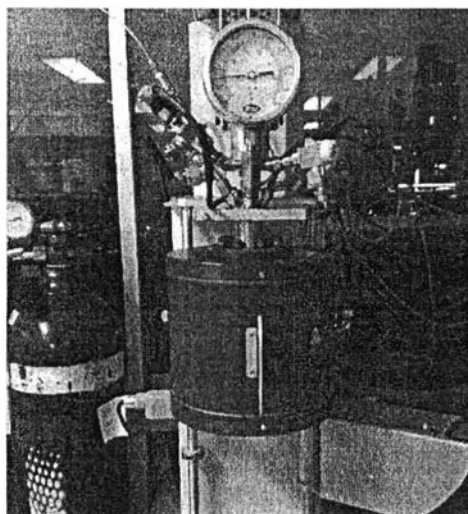


Figure B.1 Parr reactor system.

Reactor controller model 4848 is use to control the condition of the reactor and measure the main 4 parameters such as, reactor pressure, stirrer speed, reactor temperature and heater temperature. Pressure is measure by the pressure transducer and temperature is measure by thermocouple (J type). The data collected by using Parr instrument's software. The data will collect every seconds up to one and half hour. The controller and the interface of software are shown in Fig. B.2.

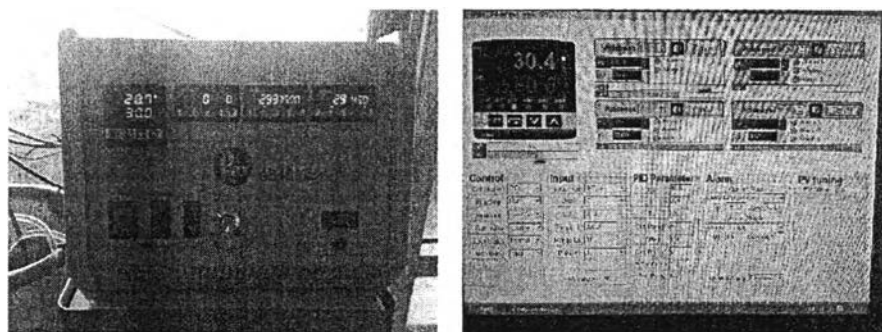


Figure B.2 Reactor controller and software.

Pressure inlet is control by the high pressure regulator and pressure inside the reactor is control by back pressure regulator. Pressure control range is 0 to 1000 psi. Pressure regulator and back pressure regulator are shown in Fig. B.3.

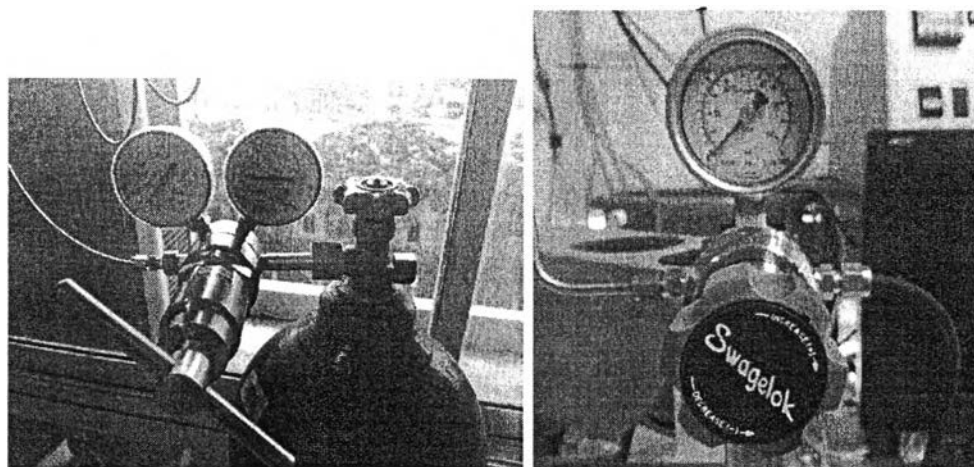


Figure B.3 Pressure regulator and back pressure regulator.

APPENDIX C: Example of Calculation

From the literature review, Li *et al.* correlation is shown in equation 1.

$$MMP = 7.3099 \times 10^{-5} \left[\ln(1.8T_R + 32) \right]^{5.33647} \left[\ln(MW_{7C+}) \right]^{2.08836} \left(1 + \frac{X_{VOL}}{X_{INT}} \right)^{2.01658 \times 10^{-1}}$$

Where, T_R is reservoir temperature ($^{\circ}\text{C}$)

MW_{C7+} is molecular weight of C_{7+}

X_{VOL} is mole fraction of volatile component (CH_4 and N_2)

X_{INT} is mole fraction of intermediate component ($\text{C}_2\text{-C}_6$, H_2S and CO_2)

Example for n-heptane at 30°C

For n-heptane

$$MW_{C7+} = 100.20$$

$$T_R = 30^{\circ}\text{C}$$

$$X_{VOL} = 0$$

$$X_{INT} = 0$$

So, $MMP =$

$$7.3099 \times 10^{-5} \left[\ln(1.8(30) + 32) \right]^{5.33647} \left[\ln(100.20) \right]^{2.08836} (1)^{2.01658 \times 10^{-1}}$$

$$MMP = 5.15 \text{ MPa}$$

$$MMP = 746.62 \text{ psi}$$

CURRICULUM VITAE

Name: Mr. Kanjanapong Yernpeng

Date of Birth: April 13, 1990

Nationality: Thai

University Education:

2008-2011 Bachelor Degree of Petrochemical and Polymeric Material Engineering, Silpakorn University, Nakhornpathom, Thailand

Work Experience:

March 2011 - June 2011 Position: Q.C. and R&D

Company name: Connect 3 Tech.Co.Ltd

Publications:

1. Achanai Buasri, Nattawut Chaiyut, Vorrada Loryuenyong, Kanjanapong Yernpeng, Pamonjita Suksamran and Saran Boonnin, (2012) "Mechanical and Thermal Properties of Polylactide Biocomposite Reinforced with Surface Modified Coir Fiber", Journal of Biobased Materials and Bioenergy, 6(6), 617-621

Presentations:

1. Yernpeng, K.; Saiwan, C.; Torabi, F. (2014, April 22) Measurement of Minimum Miscibility Pressure in Crude oil. Paper presented at The 5th Research Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.
2. Yernpeng, K.; Saiwan, C.; Torabi, F. (2014, May 7-8) Measurement of Minimum Miscibility Pressure of CO₂ in Thai Crude oil. Paper presented at The International Conference on Environment and Renewable Energy, Paris, France.