Appendix I

Experimental Data

I.1 Heated Vessel Ignition

A series of about 40 experiments were performed to study the ignition of n-hexane in air in a slowly heated vessel. The experimental conditions and results are summarized in Table I.1. Temperature and pressure traces as well as fuel concentration measurements are presented for selected shots.

As discussed in section 2.2 the temperature history was estimated from the pressure measurements. This is because the temperature is either measured with a thermocouple (K-type) at the outside of the glass vessel or internally at the end of a two-bore Pyrex tube with the bead coated. The two-bore Pyrex tube is heated and fused around the thermocouple. In order to avoid catalytic effects of the exposed end with the bead was encased in a thin layer of AREMCO-SEAL 4030, a silicone based high-temperature protective coating. While the layer around the bead is thin, the response time is still affected and the temperature measurements are not accurate for transient events.

The response time of the pressure transducer, however, is 10 μs and therefore sufficient to capture all transients of the combustion event. For the experiments performed in the closed vessel we have no changes in volume at any time during the experiment. The measurements of the fuel concentration give a good indication of when the reaction starts. Before the reaction starts, we assumed that the number of moles is constant and ideal gas law will give following result.

$$PV = N\tilde{R}T \tag{I.1}$$

$$\frac{P}{T} = \frac{N\tilde{R}}{V} = k \tag{I.2}$$

The constant k can be determined from the initial temperature and pressure. This method can also be used to find the final number of moles of gas based on the measured pressure and temperature, assuming equilibrium conditions after the reaction has been completed.

Note for shot 14: as it was one of the first shots performed in a new vessel, the target temperature of the heating system was set to around the ignition temperature. Due to the inertia of the system heating slowed down and when the reaction started the temperature oscillated around the ignition temperature. Hence, the effective heating rate is 0 K/min and no pressure rise was observed. The effective residence time that the gas spends above the temperature at which it ignites is 300 seconds (5 min).

Note for shot 17: laser absorption measurements during this test show reaction in two stages. The initial reaction starts at a temperature of 506 K and the partial pressure of fuel decreases linearly from 0.86 kPa to 0.82 kPa over the course of 65 seconds without noticeable pressure rise. The reaction then speeds up and produces a slight overpressure of 0.2 kPa.

Note for shot 18: laser oxygen diagnostic have significant interference in the windows, distorting the concentration measurements. Temperature measurements have error due to wire contact away from the thermocouple junction and can therefore not be used to normalize the etaloning.

Note for shot 20: we observe a fast reaction with overpressure, but only $\sim$17kPa.

Note for shot 26: the pressure transducer is destroyed during the ignition event because the flame is not quenched before it reaches the gage.

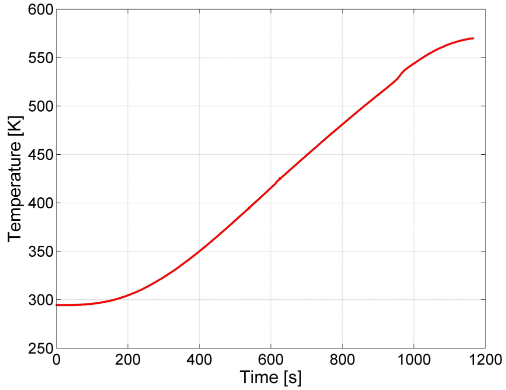
Note for shot 37 & 40: no temperature measurement available.

In the temperature measurements during the ignition events electrical noise from the 60 Hz switching of the AC power can be observed.

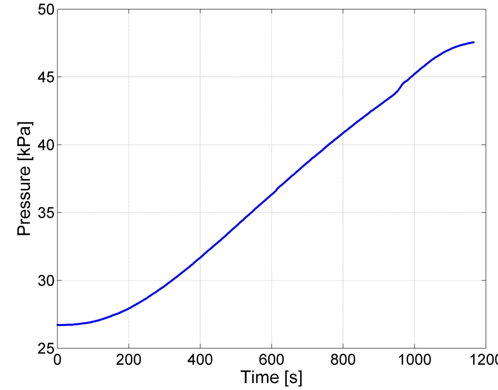
Table I.1: Heated vessel experiments

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	$\Delta T/\Delta t$ [K/min]	Fuel Consumed %	Peak Overpressure [kPa]	Ignition Temperature [K]	Result
1	7/21/08	1.524	78.85	20.96	101.33	0.69	N/A	N/A	N/A	N/A	N/A
2	7/22/08	1.520	78.85	20.96	101.32	0.69	N/A	N/A	N/A	N/A	N/A
3	7/22/08	2.189	78.31	20.82	101.33	1.00	N/A	N/A	N/A	N/A	N/A
4	7/23/08	0.576	20.61	5.48	26.67	1.00	11 (8.3*)	65	0.24	542 (463*)	SR
5	7/23/08	2.189	78.31	20.82	101.32	1.00	N/A	N/A	N/A	N/A	N/A
6	7/24/08	2.176	99.14	0.0	101.31	0.00	N/A	N/A	N/A	N/A	N/A
7	7/25/08	1.440	51.53	13.63	66.66	1.00	14 (8.6*)	85.4	14.6	531 (452*)	**FR**
8	9/4/08	2.178	78.32	20.82	101.32	0.99	5	N/A	N/A	N/A	N/A
9	9/11/08	2.197	78.31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	9/16/08	2.189	78.20	20.93	101.32	0.99	6	N/A	N/A	N/A	N/A
11	9/16/08	2.190	78.31	20.82	101.33	1.00	10	N/A	N/A	N/A	N/A
12	11/10/08	2.192	78.31	20.82	101.33	1.00	N/A	N/A	N/A	N/A	N/A
13	4/14/09	0.576	20.60	5.50	26.68	1.00	18	77	0.4	523	SR
14	4/19/09	2.189	78.31	20.82	101.32	1.00	0	60	0.0	506	SR
15	4/22/09	1.440	51.54	13.68	66.66	1.00	2	80	0.0	504	SR
16	5/19/09	1.440	51.68	13.56	66.67	1.01	11	N/A	0.7	550	SR
17	5/21/09	0.864	52.00	13.80	66.66	0.59	13	74	0.2	507	SR
18	5/29/09	0.692	20.63	5.35	26.66	1.23	N/A	N/A	0.1	N/A	SR
19	5/29/09	2.626	77.95	20.74	101.32	1.20	14	92	157.2	524	**FR**
20	6/15/09	1.725	51.30	13.21	66.23	1.24	15	73	16.7	525	**FR**
21	6/16/09	0.868	52.85	13.81	66.66	0.60	16	75	0.51	521	SR
22	6/22/09	1.013	79.27	21.08	101.36	0.46	11*	85	6.95	472*	SR
23	6/23/09	2.622	77.97	20.65	101.36	1.21	11*	93	329	470*	**FR**
24	6/24/09	2.618	78.01	20.69	101.36	1.20	5*	84	2.53	464*	SR
25	6/25/09	1.440	51.56	13.75	66.74	1.00	11*	78	1.03	471*	SR
26	6/26/09	2.189	80.30	21.12	103.71	0.98	14*	98	N/A	473*	**FR**
37	2/17/10	0.680	20.54	5.26	26.67	1.20	11*	74	0.2	470*	SR
40	3/17/10	1.440	51.53	13.69	66.66	1.00	10*	77	20	449*	**FR**

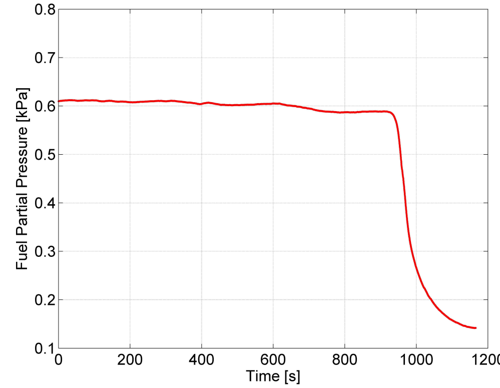
Notes: SR - Slow Reaction, FR - Fast Reaction, N/A - not available, * - estimated from pressure (see text)



(a) Temperature

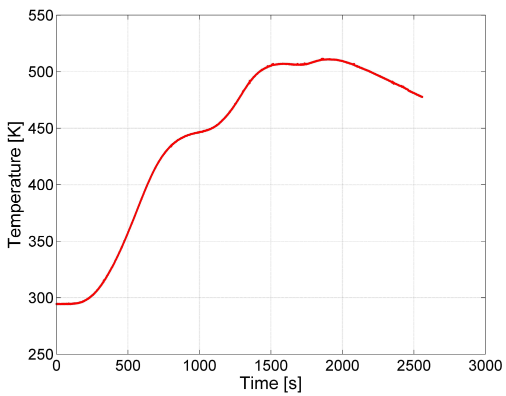


(b) Total pressure

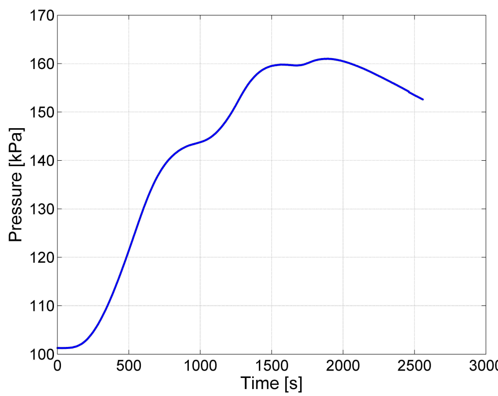


(c) Partial pressure of the fuel

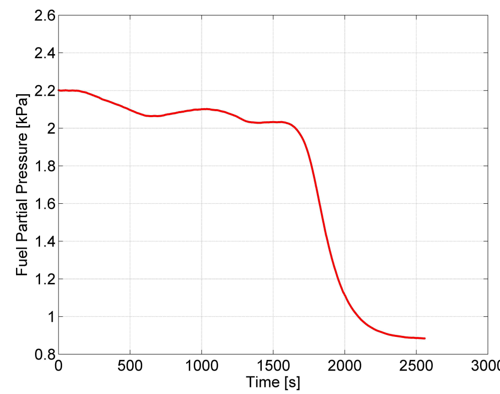
Figure I.1: Experimental data from shot 13



(a) Temperature

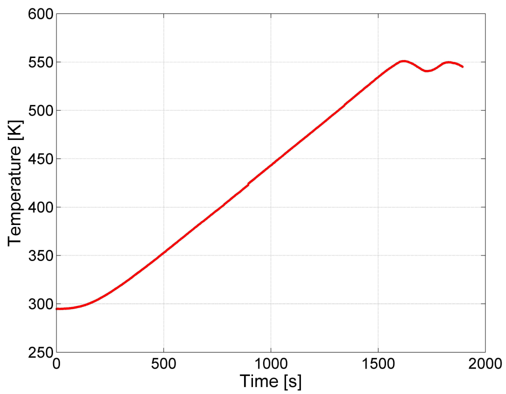


(b) Total pressure

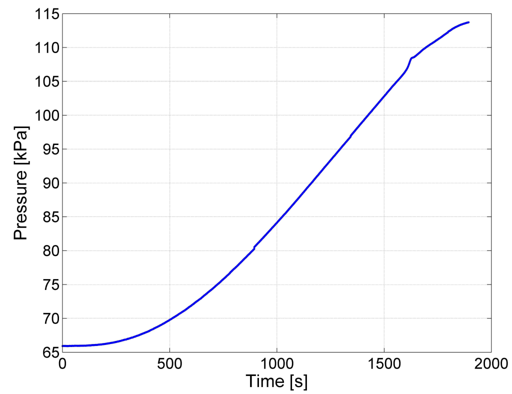


(c) Partial pressure of the fuel

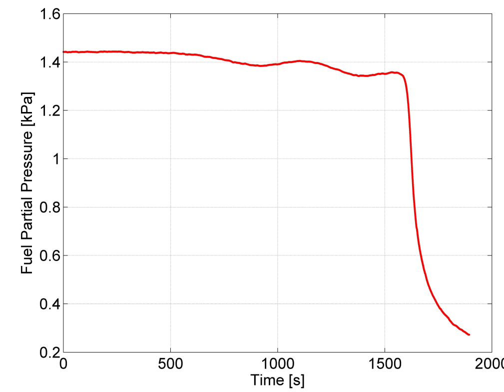
Figure I.2: Experimental data from shot 14



(a) Temperature

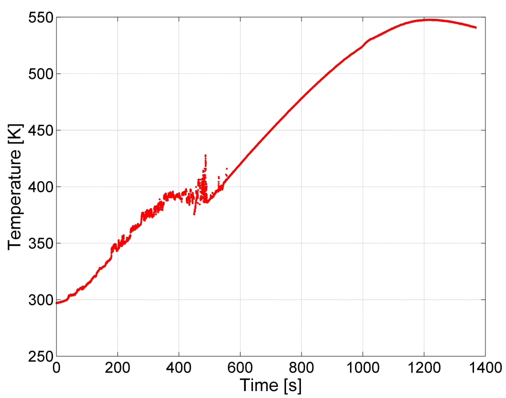


(b) Total pressure

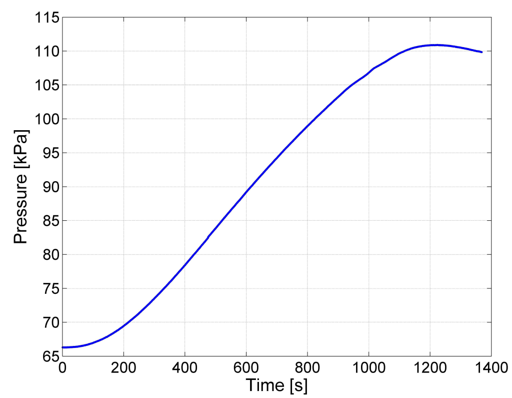


(c) Partial pressure of the fuel

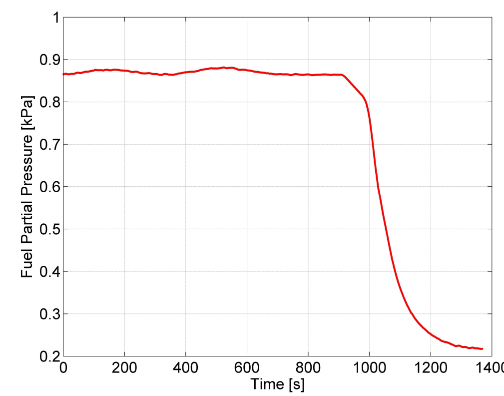
Figure I.3: Experimental data from shot 16



(a) Temperature

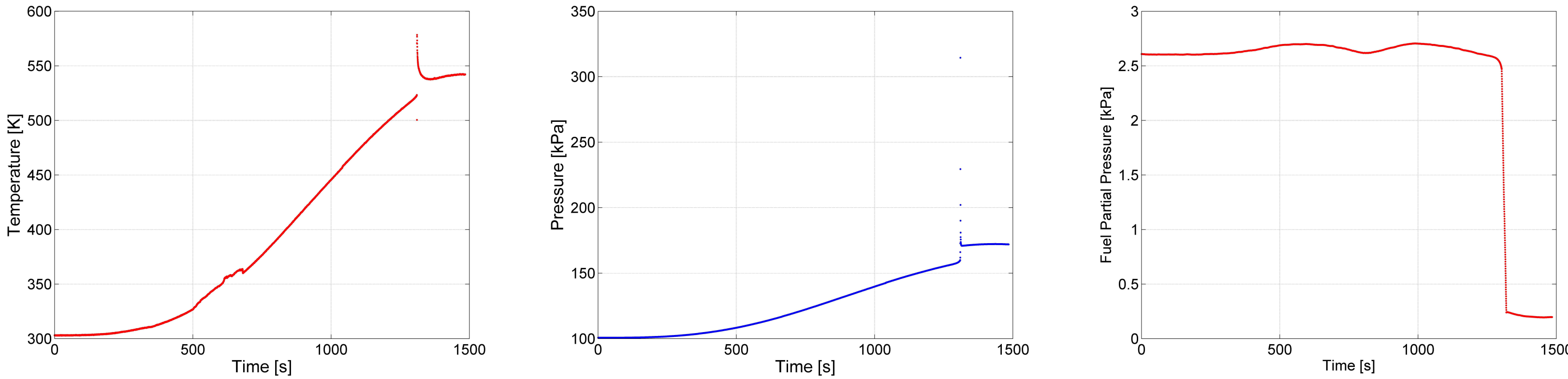


(b) Total pressure



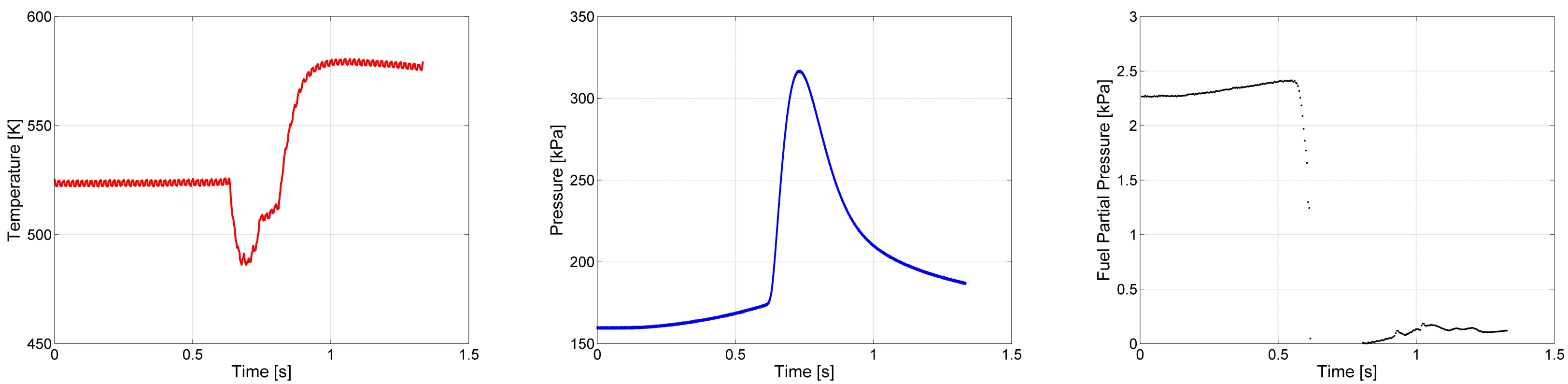
(c) Partial pressure of the fuel

Figure I.4: Experimental data from shot 17



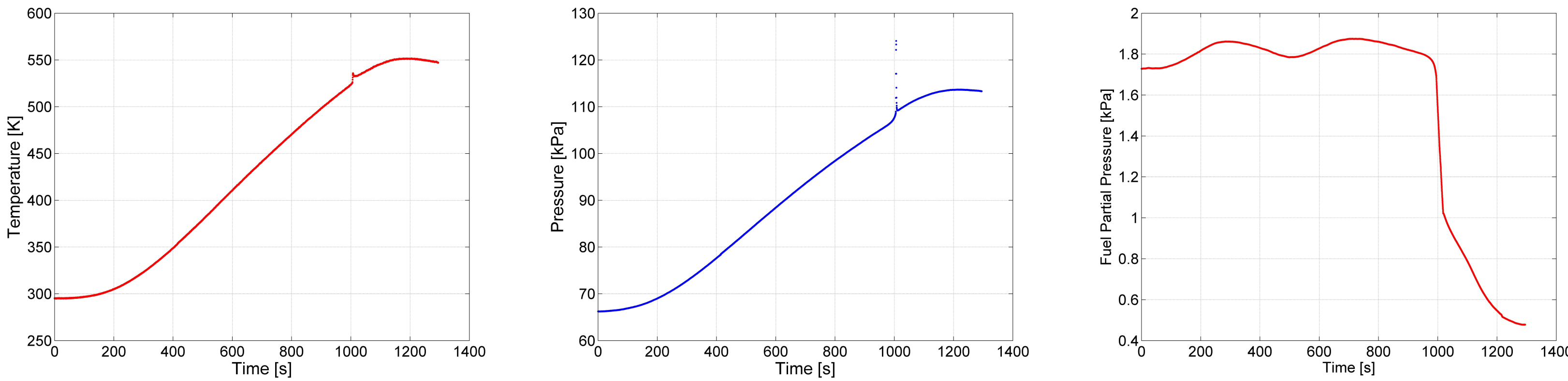
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.5: Experimental data from shot 19



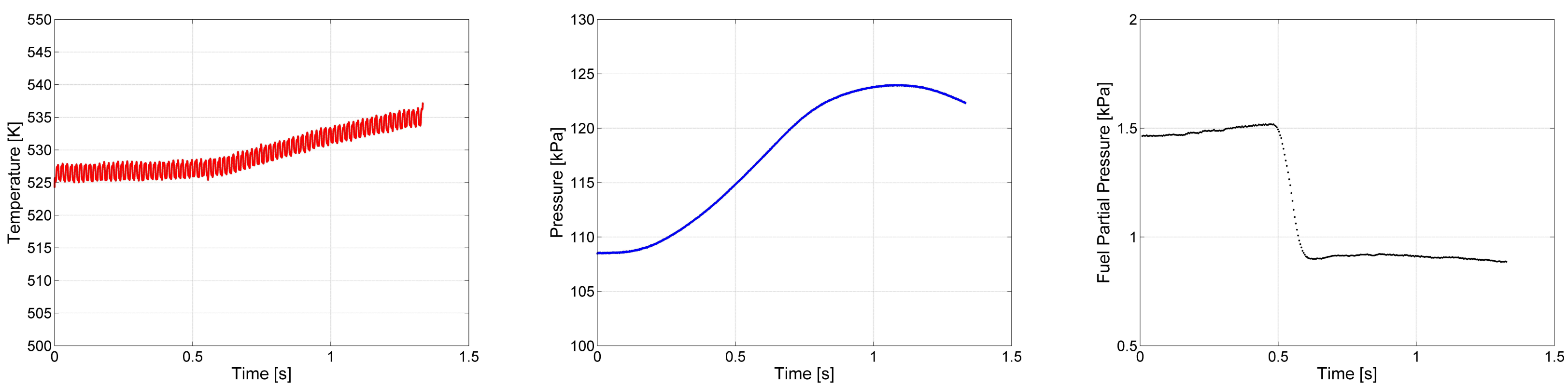
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.6: Experimental data during the ignition event from shot 19



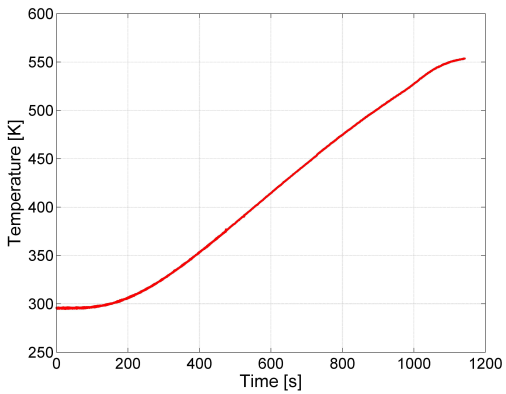
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.7: Experimental data from shot 20

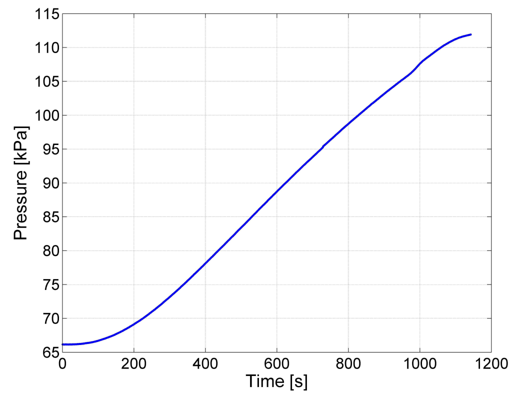


(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

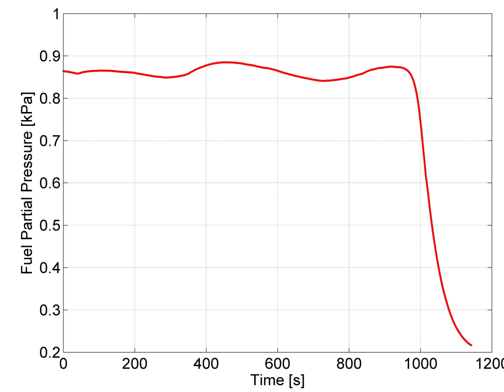
Figure I.8: Experimental data during the ignition event from shot 20



(a) Temperature

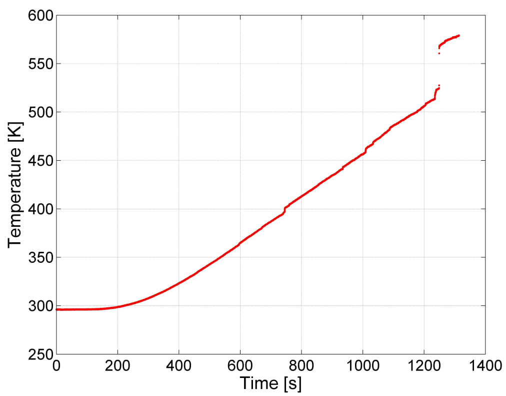


(b) Total pressure

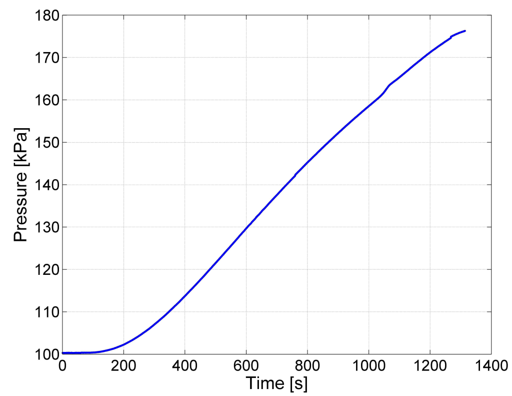


(c) Partial pressure of the fuel

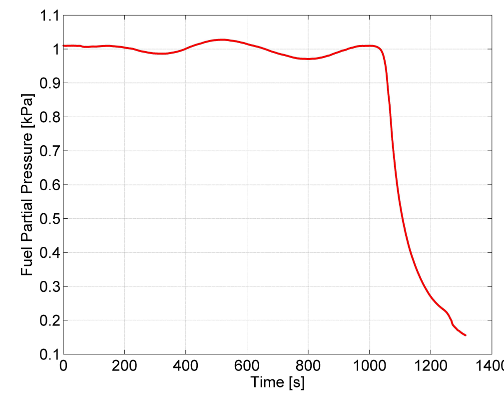
Figure I.9: Experimental data from shot 21



(a) Temperature

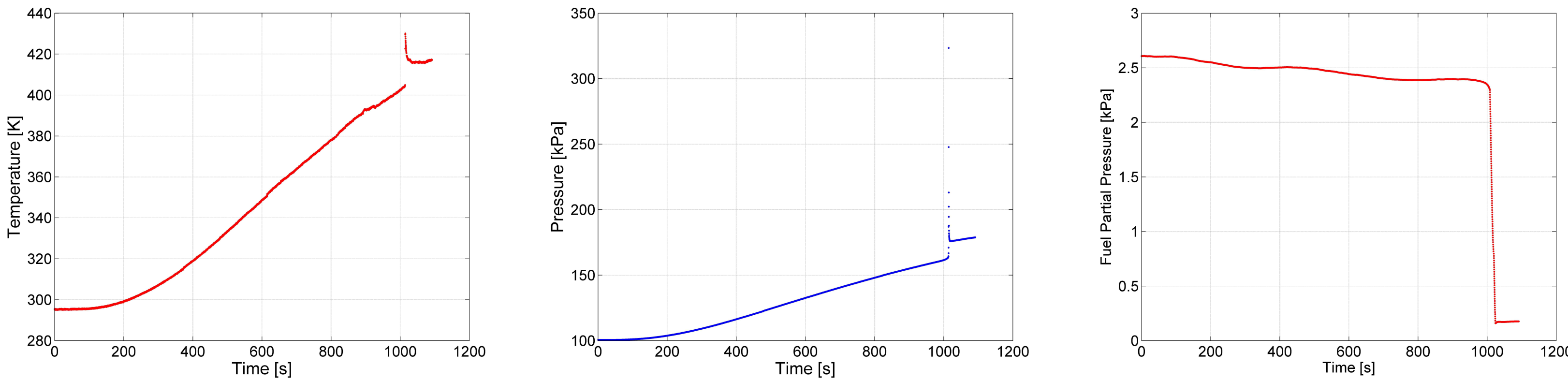


(b) Total pressure



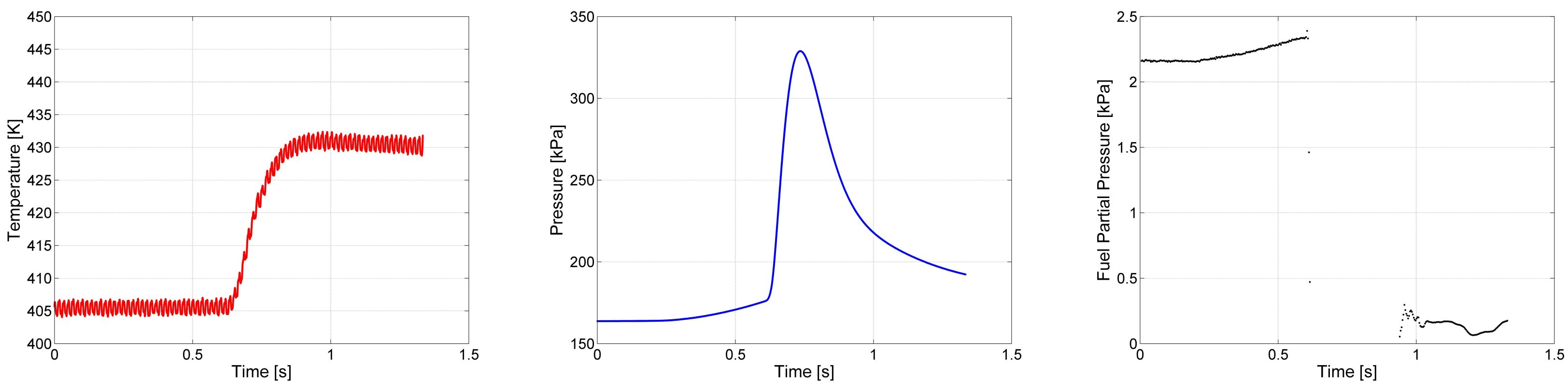
(c) Partial pressure of the fuel

Figure I.10: Experimental data from shot 22



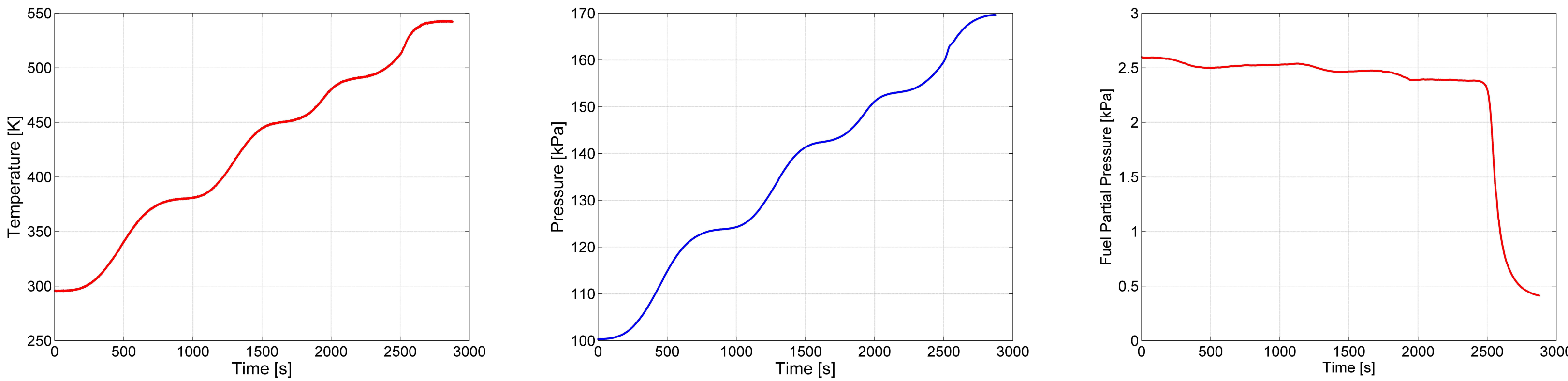
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.11: Experimental data from shot 23



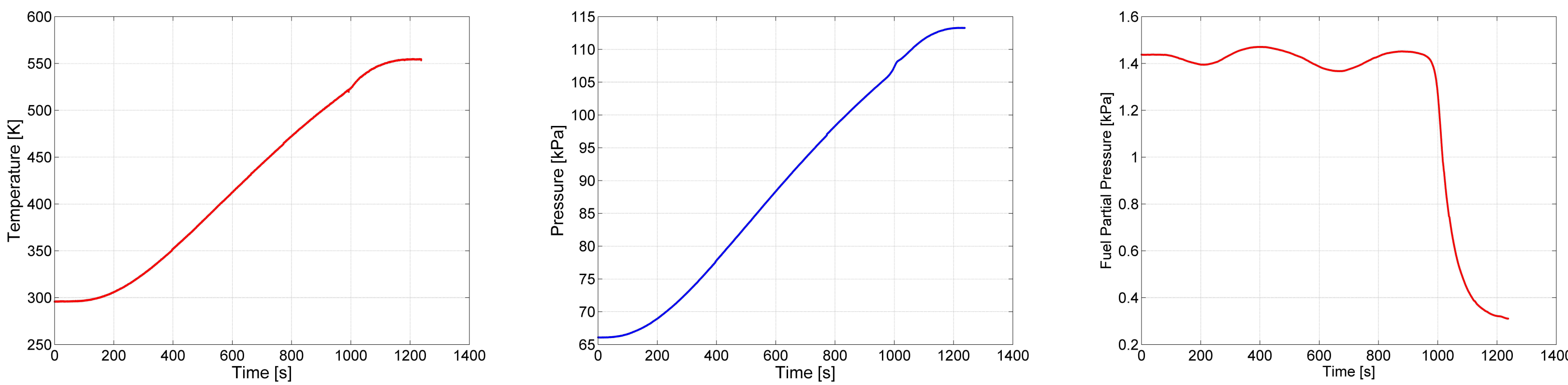
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.12: Experimental data during the ignition from event shot 23



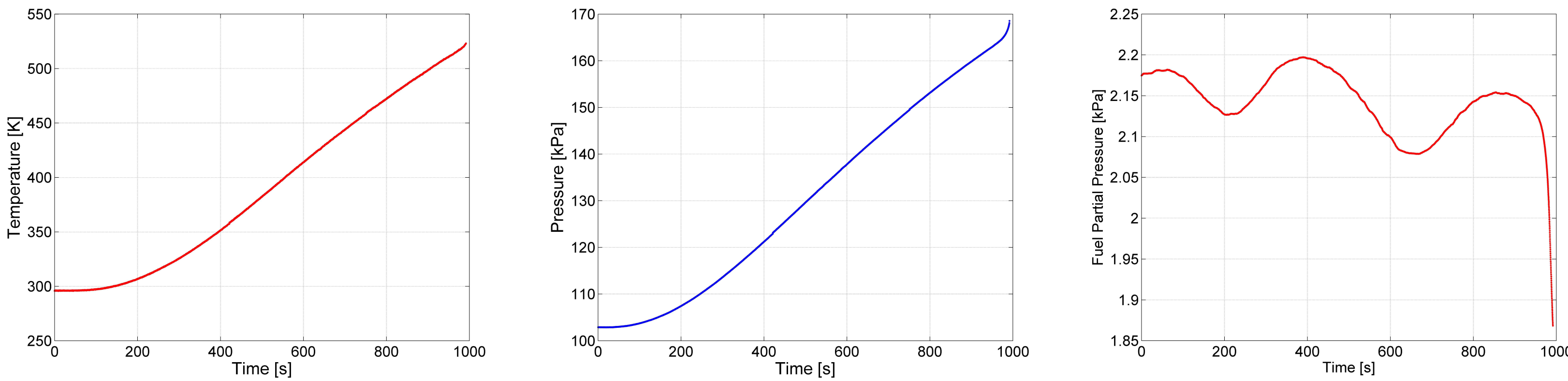
(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.13: Experimental data from shot 24



(a) Temperature (b) Total pressure (c) Partial pressure of the fuel

Figure I.14: Experimental data from shot 25

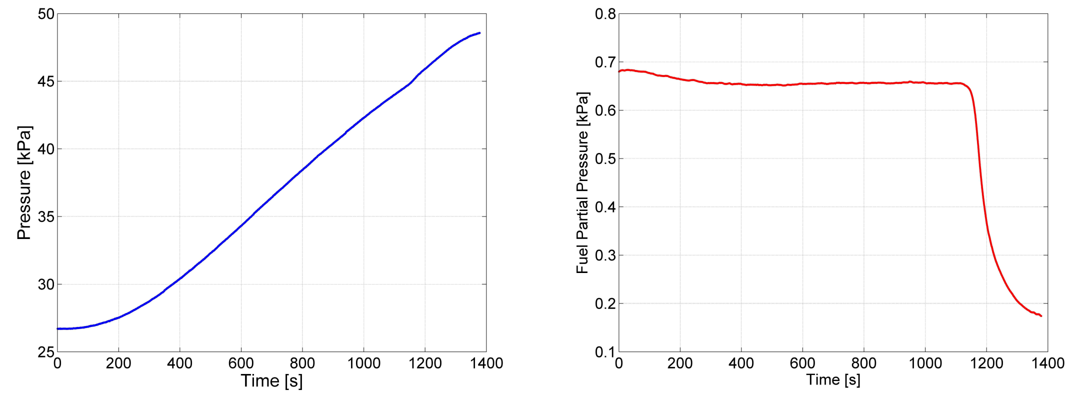


(a) Temperature

(b) Total pressure

(c) Partial pressure of the fuel

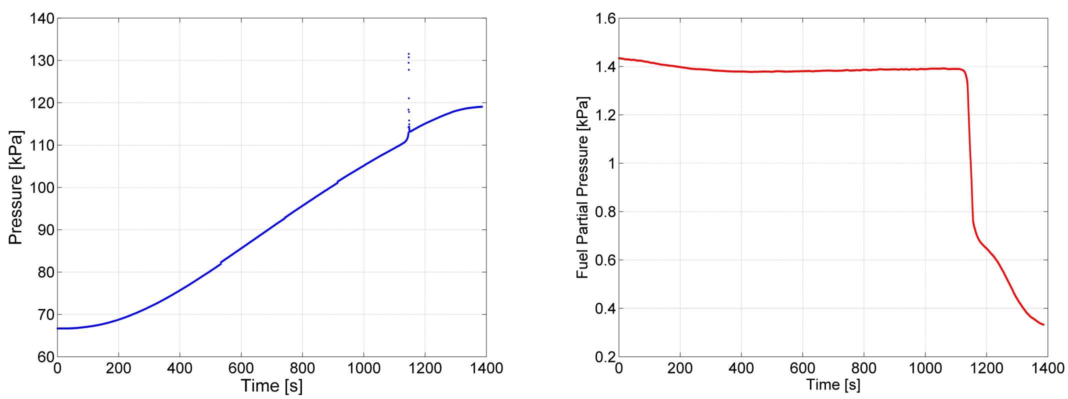
Figure I.15: Experimental data from shot 26



(a) Total pressure

(b) Partial pressure of the fuel

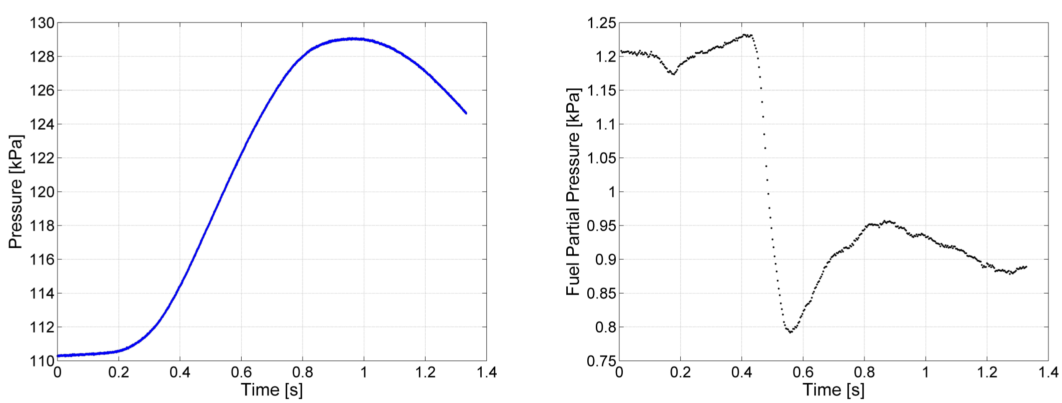
Figure I.16: Experimental data from shot 37



(a) Total pressure

(b) Partial pressure of the fuel

Figure I.17: Experimental data from shot 40



(a) Total pressure

(b) Partial pressure of the fuel

Figure I.18: Experimental data during the ignition event from shot 40

I.2 Hot Surface Ignition

This section includes the conditions for all hot surface experiments performed and also the reference spark ignition tests. In the cases where the vertical propagation velocity, V_F Top, is indicated as “not available”, but the flame propagation velocity on the sides, V_F Left & Right, are given, the top of the flame was not visible in the schlieren image. The accuracy of the pressure transducer used in filling the vessel was 0.1 Torr (0.01 kPa) and thus the composition is given to an accuracy of 2 decimal places. Temperature and pressure traces as well as schlieren images have been included for selected experiments.

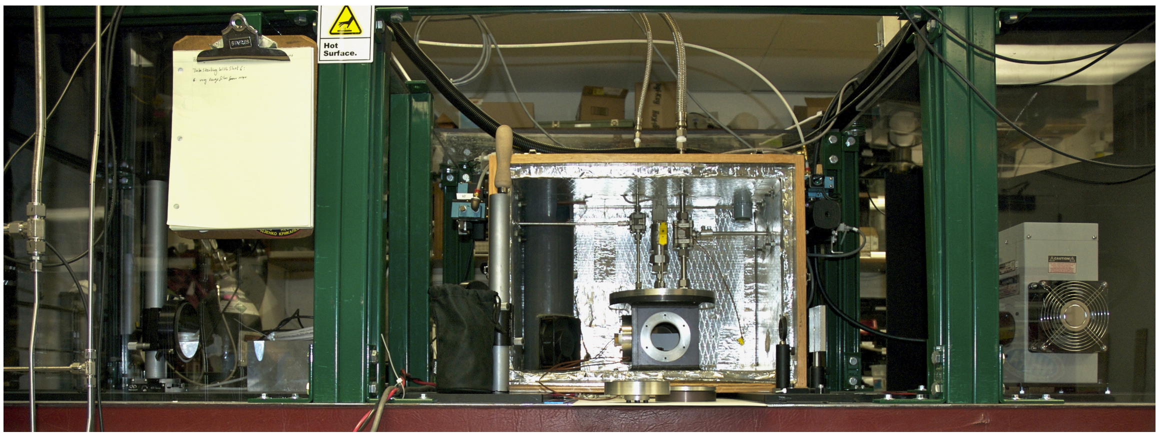


Figure I.19: The hot surface ignition vessel experimental setup.

Table I.2: Hot surface experiments with n-hexane using the Bosch glow plug in a 2 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
6	3/24/10	3.75	77.09	20.49	101.32	1.74	N/A	N/A	1.36	1.40	3.67	
7	3/24/10	2.20	78.30	20.82	101.32	1.00	721.20	N/A	1.92	2.00	3.41	
8	3/30/10	3.75	77.07	20.50	101.32	1.74	755.70	N/A	1.03	1.02	3.20	
9	3/30/10	3.75	77.09	20.49	101.32	1.74	786.70	N/A	1.19	1.26	3.46	
10	4/9/10	3.75	77.09	20.49	101.32	1.74	794.81	1030	1.45	1.43	3.70	
11	4/9/10	3.69	77.41	20.22	101.32	1.73	804.03	1058	N/A	N/A	N/A	
12	4/21/10	3.69	77.13	20.50	101.32	1.71	795.00	930	N/A	N/A	N/A	
13	5/12/10	6.32	75.05	19.97	101.34	3.01	-	-	-	-	-	NoGo
14	5/12/10	5.31	75.86	20.16	101.32	2.50	381.91	N/A	N/A	N/A	N/A	f = 9.19 Hz
15	5/12/10	5.80	75.46	20.06	101.32	2.75	212.91	925	0.28	0.31	1.54	f = 9.84 Hz
16	5/13/10	6.31	75.06	19.96	101.32	3.00	N/A	N/A	N/A	N/A	N/A	
17	5/13/10	6.31	75.05	19.96	101.31	3.00	173.00	922	0.11	0.13	1.24	f = 12.63 Hz
18	5/13/10	1.65	78.73	20.93	101.31	0.75	N/A	N/A	N/A	N/A	N/A	
20	6/29/10	4.80	76.26	20.26	101.32	2.25	491.86	911	0.39	0.39	1.99	f = 8.40 Hz
21	6/30/10	5.12	75.99	20.21	101.32	2.41	406.30	911	0.39	0.38	1.91	
24	7/9/10	2.61	77.98	20.73	101.32	1.20	802.20	939	2.89	3.26	5.43	
25	7/12/10	1.65	78.73	20.93	101.31	0.75	648.00	917	1.15	1.17	2.41	
26	7/12/10	1.76	78.66	20.90	101.32	0.80	657.00	912	1.28	1.34	2.60	
27	7/12/10	1.96	78.47	20.88	101.31	0.89	N/A	910	2.20	2.18	3.85	
28	7/12/10	1.33	79.03	20.98	101.35	0.60	460.10	1452	0.33	0.35	N/A	
29	7/12/10	2.83	77.82	20.66	101.31	1.30	795.90	893	2.86	2.93	5.50	
30	7/13/10	1.33	77.78	21.00	101.31	0.60	479.30	1407	0.26	0.28	N/A	
31	7/13/10	3.04	77.65	20.64	101.32	1.40	803.30	891	2.47	2.48	5.16	
32	7/13/10	3.25	77.46	20.61	101.32	1.50	803.30	890	1.92	1.95	4.57	
33	7/13/10	4.08	76.87	20.42	101.38	1.90	643.20	919	0.69	0.69	2.64	
34	7/13/10	4.29	76.67	20.36	101.32	2.00	506.30	929	0.53	0.52	2.31	
35	7/14/10	1.21	79.07	21.02	101.32	0.55	-	-	-	-	-	NoGo

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1515 K

Table I.3: Hot surface experiments with n-hexane using the Bosch glow plug in a 2 liter vessel (continued)

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
36	7/14/10	1.45	78.93	20.94	101.32	0.66	579.31	1216	0.52	0.55	N/A	
37	7/14/10	1.55	78.83	20.94	101.32	0.70	600.35	1170	0.65	0.66	N/A	
38	7/14/10	2.19	78.34	20.80	101.30	1.00	748.31	894	2.46	2.58	4.54	
39	7/15/10	3.67	77.14	20.49	101.32	1.70	-	-	-	-	-	No Trigger
40	7/15/10	3.63	77.15	20.53	101.31	1.68	768.24	940	1.21	1.24	3.60	
41	7/15/10	5.31	75.86	20.16	101.32	2.50	201.47	975	0.22	0.20	1.54	f = 10.64 Hz
42	7/15/10	6.31	75.05	19.94	101.30	3.00	160.51	900	0.14	0.14	1.30	f = 12.20 Hz
43	7/20/10	3.03	50.29	13.37	66.69	2.15	252.76	940	0.40	0.38	1.71	f = 6.67 Hz
44	7/20/10	3.49	49.90	13.27	66.66	2.50	123.24	985	0.24	0.21	1.46	f = 10.87 Hz
45	7/20/10	5.31	75.85	20.16	101.31	2.50	180.07	926	0.17	0.16	1.44	f = 11.11 Hz
46	7/20/10	4.60	76.45	20.30	101.35	2.15	435.78	922	0.43	0.42	2.05	f = 7.30 Hz
47	7/20/10	1.21	20.08	5.36	26.65	2.15	122.65	1091	0.79	0.76	2.08	
48	7/20/10	1.41	19.97	5.28	26.66	2.54	N/A	N/A	0.32	N/A	1.47	f = 7.69 Hz
49	7/21/10	1.40	19.94	5.32	26.66	2.50	57.12	1102	0.29	0.29	1.39	f = 7.87 Hz
50	7/21/10	2.09	29.93	7.97	40.00	2.49	83.02	1049	0.31	0.27	1.44	f = 9.71 Hz
51	7/21/10	1.81	30.17	8.03	40.01	2.15	147.97	1034	0.64	0.60	2.07	

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1515 K

Table I.4: Hot surface experiments with n-hexane using the Autolite glow plug in a 2 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
52	8/16/10	3.71	76.91	20.68	101.30	1.70	N/A	N/A	1.06	1.00	3.53	
53	8/16/10	3.69	77.37	20.49	101.55	1.71	679.68	N/A	N/A	N/A	N/A	
54	8/27/10	6.23	74.81	20.17	101.20	2.93	128.00	N/A	T/C array trips instabilities			f = 12.06 Hz
55	10/13/10	3.24	77.46	20.61	101.31	1.49	668.61	N/A	T/C array trips instabilities			
56	10/13/10	4.80	76.23	20.33	101.36	2.24	376.74	N/A	N/A	N/A	N/A	
57	10/13/10	4.79	76.26	20.26	101.31	2.24	366.41	N/A	T/C array trips instabilities			
58	10/13/10	5.31	75.83	20.18	101.32	2.50	209.22	N/A	T/C array trips instabilities			f = 9.48 Hz
59	10/20/10	6.19	75.07	20.22	101.48	2.91	N/A	N/A	N/A	N/A	N/A	
60	10/20/10	6.31	75.06	19.96	101.32	3.00	N/A	N/A	T/C array trips instabilities			f = 12.66 Hz
61	10/20/10	2.19	78.31	20.82	101.32	1.00	667.51	N/A	N/A	N/A	N/A	
62	10/20/10	1.33	78.97	21.02	101.32	0.60	-	-	-	-	-	NoGo
63	10/21/10	1.65	78.74	20.93	101.32	0.75	N/A	N/A	N/A	N/A	N/A	
64	10/21/10	1.55	78.83	20.94	101.32	0.70	523.97	N/A	N/A	N/A	N/A	
95	2/15/11	6.28	75.07	19.97	101.32	2.99	142.06	1146	direct imaging			f = 13.39 Hz
96	2/15/11	6.31	75.07	19.94	101.32	3.00	139.48	1200	direct imaging			f = 14.35 Hz
99	2/23/11	6.31	75.06	19.96	101.32	3.00	135.79	1300	N/A	N/A	N/A	No Video
100	2/24/11	6.29	75.03	20.00	101.32	2.99	142.80	1162	direct imaging w/ CH* filter †			f = 13.12 Hz
101	2/24/11	6.31	75.06	19.96	101.32	3.00	141.32	1070	direct imaging w/ CH* filter †			f = 12.97 Hz
102	2/24/11	6.29	75.07	19.96	101.32	3.00	140.95	1068	direct imaging w/ CH* filter ⋆			f = 12.88 Hz
103	3/3/11	6.31	75.06	19.94	101.31	3.00	142.06	1362	direct imaging w/ CH* filter ⋆			
104	3/3/11	6.31	75.05	19.96	101.31	3.00	140.95	1417	direct imaging w/ CH* filter ⋆			f = 13.02 Hz
113	4/5/11	6.32	75.02	19.98	101.32	3.00	132.84	N/A	direct imaging w/ PI-MAX 3 ICCD			No Images
114	4/5/11	6.32	75.06	19.94	101.32	3.01	137.63	N/A	direct imaging w/ PI-MAX 3 ICCD			fps too low
118	5/3/11	4.91	76.15	20.26	101.32	2.30	208.11	881.5	direct imaging w/ CH* filter ‡			f = 8.16 Hz
119	5/3/11	5.23	75.91	20.18	101.32	2.46	225.82	897.5	direct imaging w/ CH* filter ‡			f = 8.33 Hz

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1453 K, fps - frames per second

† Newport Filter 20BPF70-450 (Bandpass Filter, 50.8 × 50.8 mm, 450±10 nm Center, 70±30 nm FWHM)

⋆ Newport Filter 20BPF70-450 (see above) & MellesGriot SPF-500 (Short Pass Filter, Transmittance > 75% 430-500 nm)

‡ Edmund Optics Filter 43-160 (430 nm Center Wave Length, 10 nm Bandwidth, 50.8 × 50.8 mm)

Table I.5: Hot surface experiments with n-heptane using the Autolite glow plug in a 2 liter vessel

Shot	Date	$P_{n\text{-heptane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
65	10/21/10	1.89	78.55	20.88	101.32	1.00	658.28	N/A	2.36	2.46	4.30	
66	10/21/10	3.73	77.10	20.40	101.23	2.01	685.22	N/A	1.46	1.37	4.74	
67	10/26/10	1.19	79.10	21.04	101.32	0.62	-	-	-	-	-	NoGo
68	10/26/10	4.40	76.39	20.53	101.32	2.36	448.69	N/A	T/C array trips instabilities			
69	10/26/10	5.35	76.81	20.18	102.34	2.91	395.19	N/A	T/C array trips instabilities			f = 10.72 Hz
70	10/28/10	3.54	76.59	21.18	101.32	1.84	396.74	N/A	T/C array trips instabilities			Filling Error†

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1453 K
† The mixture was filled using the Endevco gage, which is much less accurate.The final pressure before ignition was 603 Torr due to a leak through the vacuum valve.

Table I.6: Spark ignition experiments of n-hexane air mixtures in a 22 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Gap Width [mm]	C [μC]	V [V]	Energy [J]	Note
71	1/14/11	6.29	75.08	19.95	101.32	3.00	-	-	-	4	5	300	0.225	No Ignition After 3 Sparks
72	1/14/11	5.31	75.85	20.16	101.32	2.50	-	-	-	4	5	300	0.225	No Ignition After 3 Sparks
73	1/14/11	2.19	78.52	20.87	101.58	1.00	2.81	2.83	N/A	4	5	300	0.225	
74	1/18/11	6.30	75.07	19.95	101.32	3.00	-	-	-	6	5	300	0.225	No Ignition After 3 Sparks
75	1/18/11	5.31	76.05	20.16	101.53	2.50	-	-	-	6	5	300	0.225	No Ignition After 3 Sparks
76	1/20/11	4.28	76.67	20.39	101.33	1.99	0.40	0.46	0.63	6	5	300	0.225	
77	1/20/11	5.31	75.85	20.16	101.32	2.50	N/A	N/A	N/A	6	5	300	0.225	No Video Available
78	1/24/11	6.25	75.12	19.96	101.33	2.98	-	-	-	2.4-9.5	10	300	0.450	No Ignition After 3 Sparks
79	1/24/11	6.28	75.09	19.96	101.33	2.99	-	-	-	2.4-9.5	10	300	0.450	No Ignition After 4 Sparks

Notes: N/A - not available, energy of the spark is based on the stored energy $E = \frac{1}{2}CV^2$

Table I.7: Hot surface experiments with n-hexane using the Autolite glow plug in a 22 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
80	1/31/11	6.30	75.07	19.96	101.33	3.00	124.88	N/A	0.07	0.04	0.72	f = 14.93 Hz
81	2/1/11	6.30	75.06	19.96	101.32	3.00	128.14	1123	0.04	0.06	0.75	f = 14.39 Hz
82	2/1/11	6.30	75.07	19.95	101.32	3.00	-	-	-	-	-	NoGo at 1453 K
83	2/1/11	6.30	75.08	19.95	101.33	3.00	-	-	-	-	-	NoGo at 1453 K
105	3/3/11	5.30	75.08	19.95	100.33	2.52	-	-	-	-	-	NoGo
106	3/3/11	4.59	76.42	20.32	101.32	2.15	-	-	-	-	-	NoGo
107	3/3/11	5.26	75.90	20.16	101.32	2.48	-	-	-	-	-	NoGo
108	3/3/11	4.60	76.42	20.29	101.30	2.15	-	-	-	-	-	NoGo
109	3/29/11	2.19	78.02	20.82	101.03	1.00	-	-	-	-	-	NoGo
110	3/29/11	2.61	77.97	20.74	101.32	1.20	861.67	N/A	N/A	N/A	N/A	GP Upside Down
111	3/31/11	6.29	75.06	19.97	101.32	2.99	-	-	-	-	-	NoGo
112	3/31/11	6.27	75.05	20.00	101.32	2.98	129.68	N/A	0.20	0.03	1.39	f = 14.53 Hz, GP at 24.5° angle

Notes: N/A - not available, NoGo - no ignition

Table I.8: Hot surface experiments with n-hexane using varying hot surfaces in a 2 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temp. [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note	Area [m^2]
84	2/2/11	6.31	75.06	19.96	101.32	3.00	-	-	-	-	-	NoGo, Brass Foil	2.4×10^{-5}
85	2/3/11	6.31	75.06	19.96	101.32	3.00	123.98	982	0.13	0.11	0.92	Copper Foil	
86	2/3/11	6.31	75.09	19.93	101.32	3.01	135.05	980	0.04	0.11	0.78	f = 20.42 Hz, Nickel Foil	2.4×10^{-5}
87	2/3/11	6.31	75.09	19.94	101.34	3.00	138.37	N/A	0.13	0.12	0.75	f = 14.45 Hz, Nickel Wire	2.4×10^{-6}

Notes: N/A - not available, NoGo - no ignition

Table I.9: Hot surface experiments with hydrogen using the Autolite glow plug in a 2 liter vessel

Shot	Date	P_{H_2} [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	ϕ	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
88	2/8/11	7.60	34.02	9.04	50.66	0.42	N/A	N/A	N/A	N/A	N/A	
89	2/8/11	7.09	74.43	19.80	101.32	0.18	-	-	-	-	-	NoGo
90	2/10/11	7.09	74.45	19.78	101.32	0.18	111.4	840	0.12	0.13	1.18	f = 10.53 Hz
91	2/10/11	8.11	74.17	19.69	101.96	0.21	125.8	808	0.17	0.14	1.41	f = 8.89 Hz
92	2/10/11	5.07	76.05	20.21	101.32	0.13	indiscernible	910	0.07	0.05	0.78	
93	2/10/11	72.95	22.40	5.97	101.32	6.11	384.1	1038	3.00	2.70	4.84	
94	2/10/11	74.97	20.82	5.53	101.32	6.77	361.2	1087	1.66	1.71	2.54	

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1453 K

Table I.10: Hot surface experiments with hydrogen-hexane-air mixtures using the Autolite glow plug in a 2 liter vessel

Shot	Date	$P_{n\text{-hexane}}$ [kPa]	P_{H_2} [kPa]	P_{N_2} [kPa]	P_{O_2} [kPa]	P_{total} [kPa]	Peak Pressure [kPa]	Ignition Temperature [K]	V_F Left [m/s]	V_F Right [m/s]	V_F Top [m/s]	Note
97	2/15/11	1.47	5.07	74.89	19.90	101.32	649.80	999	1.58	1.44	3.79	
98	2/15/11	5.99	5.07	71.31	18.96	101.32	139.50	1001	0.17	0.12	1.15	f = 13.83 Hz
115	4/6/11	1.28	3.05	76.65	20.36	101.34	594.44	935	1.17	1.15	3.68	
116	4/7/11	1.47	3.17	76.31	20.32	101.27	650.90	876.8	2.24	1.90	5.38	
117	4/7/11	1.39	10.15	70.93	18.88	101.34	668.61	865.9	4.89	4.67	11.84	
120	5/26/11	1.09	1.01	78.35	20.82	101.28	-	-	-	-	-	NoGo
121	5/26/11	1.13	2.03	77.54	20.61	101.31	483.01	1158	0.42	0.37	2.01	
122	5/26/11	1.13	1.52	77.94	20.72	101.31	396.30	1180	0.29	0.22	1.60	
123	5/26/11	1.07	1.53	77.98	20.73	101.31	327.66	1205	0.20	0.17	1.39	f = 17.37 Hz

Notes: N/A - not available, NoGo - no ignition with the glow plug reaching 1453 K

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