

MEASUREMENTS OF LAMINAR BURNING VELOCITIES ABOVE ATMOSPHERIC PRESSURE USING THE HEAT FLUX METHOD - APPLICATION TO THE CASE OF *N*-PENTANE

Patricia Dirrenberger, Hervé Le Gall, Roda Bounaceur, Pierre -Alexandre Glaude, Frédérique Battin-Leclerc*

Laboratoire Réactions et Génie des Procédés, Université de Lorraine, CNRS, ENSIC, BP 20451, 1 rue Grandville, 54001 Nancy, France

Methane burning velocity vs. equivalence ratio at atmospheric pressure and 298, 318, 358, and 398 K

PHI	S [298 K] (cm/s)	S [318 K] (cm/s)	S [358 K] (cm/s)	S [398 K] (cm/s)
0.60			12.9 ± 0.6	16.8 ± 0.7
0.70	15.3 ± 0.6	18.1 ± 0.7	22.9 ± 0.7	29.0 ± 0.8
0.75	19.5 ± 0.7			
0.80	23.9 ± 0.8	26.9 ± 0.8	33.0 ± 0.9	40.8 ± 1.0
0.85	27.7 ± 0.8			
0.90	31.2 ± 0.9	34.5 ± 0.9	41.6 ± 1.0	50.9 ± 1.2
0.95	34.1 ± 0.9			
1.00	36.3 ± 0.9	39.4 ± 1.0	47.8 ± 1.1	57.0 ± 1.3
1.05	37.5 ± 1.0			
1.10	38.1 ± 1.0	41.2 ± 1.0	50.3 ± 1.2	58.9 ± 1.3
1.15	37.5 ± 1.0			
1.20	36.1 ± 0.9	39.0 ± 1.0	47.1 ± 1.1	55.4 ± 1.2
1.25	33.2 ± 0.9			
1.30	29.4 ± 0.8	32.5 ± 0.9	39.0 ± 1.0	46.5 ± 1.1
1.35	25.0 ± 0.8			
1.40	20.6 ± 0.7	22.6 ± 0.7	27.5 ± 0.8	34.5 ± 0.9
1.45	16.4 ± 0.6			
1.50	13.0 ± 0.6	14.0 ± 0.6	17.1 ± 0.7	22.8 ± 0.7
1.60	8.9 ± 0.5	9.4 ± 0.5	11.6 ± 0.6	14.9 ± 0.6
1.70	6.6 ± 0.5	6.8 ± 0.5	8.5 ± 0.5	10.9 ± 0.6
1.80			6.5 ± 0.5	8.4 ± 0.5
1.90				7.0 ± 0.5

Methane burning velocity vs. equivalence ratio at 298 K and 1, 1.5, 2, and 3 atm

PHI	S [1 atm] (cm/s)	S [1.5 atm] (cm/s)	S [2 atm] (cm/s)	S [3 atm] (cm/s)
0.70	15.3 ± 0.6	13.0 ± 0.6	11.3 ± 0.6	9.1 ± 0.5
0.75	19.5 ± 0.7	16.8 ± 0.7	14.5 ± 0.6	11.8 ± 0.6
0.80	23.9 ± 0.8	20.1 ± 0.7	18.0 ± 0.7	15.1 ± 0.6
0.85	27.7 ± 0.8	23.6 ± 0.8	21.0 ± 0.7	
0.90	31.2 ± 0.9	26.6 ± 0.8	24.1 ± 0.8	
0.95	34.1 ± 0.9	28.4 ± 0.8	26.5 ± 0.8	
1.00	36.3 ± 0.9	30.0 ± 0.8		
1.05	37.5 ± 1.0	31.0 ± 0.9		
1.10	38.1 ± 1.0	31.4 ± 0.9		
1.15	37.5 ± 1.0	30.6 ± 0.9		
1.20	36.1 ± 0.9	28.7 ± 0.8		
1.25	33.2 ± 0.9	26.7 ± 0.8		
1.30	29.4 ± 0.8	23.4 ± 0.8		
1.35	25.0 ± 0.8	21.0 ± 0.7		
1.40	20.6 ± 0.7	17.4 ± 0.7		
1.45	16.4 ± 0.6	14.4 ± 0.6		
1.50	13.0 ± 0.6			
1.60	8.9 ± 0.5			
1.70	6.6 ± 0.5			

Methane burning velocity vs. pressure at 298 K and ϕ 0.7, 0.8, 0.9, and 1 for pressures up to 6 atm

P (atm)	S [ϕ 0.7] (cm/s)	P (atm)	S [ϕ 0.8] (cm/s)	P (atm)	S [ϕ 0.9] (cm/s)	P (atm)	S [ϕ 1.0] (cm/s)
0.98	16.0 ± 0.6	0.98	24.9 ± 0.8	0.98	30.9 ± 0.9	0.98	36.1 ± 0.9
1.18	14.7 ± 0.6	1.17	22.7 ± 0.7	1.18	29.0 ± 0.8	1.16	33.1 ± 0.9
1.29	13.8 ± 0.6	1.29	21.7 ± 0.7	1.30	28.0 ± 0.8	1.31	31.0 ± 0.9
1.47	13.0 ± 0.6	1.50	20.1 ± 0.7	1.48	26.6 ± 0.8	1.52	29.4 ± 0.8
1.78	11.8 ± 0.6	1.73	19.0 ± 0.7	1.74	24.8 ± 0.8	1.71	28.7 ± 0.8
1.96	11.3 ± 0.6	1.96	18.0 ± 0.7	1.97	24.1 ± 0.8	1.88	28.2 ± 0.8
2.26	10.6 ± 0.6	2.24	17.0 ± 0.7	2.23	23.3 ± 0.7		
2.49	10.1 ± 0.6	2.46	16.5 ± 0.6				
2.76	9.6 ± 0.5	2.72	15.8 ± 0.6				
3.01	9.1 ± 0.5	2.96	15.1 ± 0.6				
3.54	8.3 ± 0.5	3.24	14.6 ± 0.6				
3.94	7.9 ± 0.5	3.48	14.3 ± 0.6				
4.49	7.3 ± 0.5	3.63	14.0 ± 0.6				
5.03	7.0 ± 0.5	3.79	13.8 ± 0.6				
6.07	6.4 ± 0.5						

<i>n</i> -Pentane burning velocity vs. equivalence ratio at atmospheric pressure and 298, 318, 358, and 398 K				<i>n</i> -Pentane burning velocity vs. pressure at 298 K and ϕ 0.7, 0.8, 0.9, and 1 for pressures up to 4.2 atm							
PHI	S [298 K] (cm/s)	S [358 K] (cm/s)	S [398 K] (cm/s)	P (atm)	S [ϕ 0.7] (cm/s)	P (atm)	S [ϕ 0.8] (cm/s)	P (atm)	S [ϕ 0.9] (cm/s)	P (atm)	S [ϕ 1.0] (cm/s)
0.55			16.4 ± 0.6	0.99	20.0 ± 0.7	0.96	27.5 ± 0.8	0.99	33.6 ± 0.9	0.99	37.7 ± 1.0
0.60		17.4 ± 0.7	21.7 ± 0.7	1.24	17.7 ± 0.7	1.21	24.9 ± 0.8	1.27	30.5 ± 0.9	1.20	34.7 ± 0.9
0.65	16.4 ± 0.6	22.7 ± 0.7	27.3 ± 0.8	1.51	16.4 ± 0.6	1.48	23.2 ± 0.7	1.49	29.2 ± 0.8		
0.70	20.3 ± 0.7	27.6 ± 0.8	33.5 ± 0.9	1.78	15.5 ± 0.6	1.76	21.9 ± 0.7	1.70	28.2 ± 0.8		
0.75	24.2 ± 0.8	32.9 ± 0.9	39.0 ± 1.0	1.99	15.1 ± 0.6	1.99	21.2 ± 0.7				
0.80	27.8 ± 0.8	37.5 ± 1.0	44.6 ± 1.1	2.29	14.4 ± 0.6						
0.85	31.1 ± 0.9	41.4 ± 1.0	49.3 ± 1.1	2.45	14.0 ± 0.6						
0.90	33.6 ± 0.9	45.1 ± 1.1	53.1 ± 1.2	2.65	13.7 ± 0.6						
0.95	36.0 ± 0.9	47.9 ± 1.1	56.5 ± 1.2	2.85	13.3 ± 0.6						
1.00	37.7 ± 1.0	49.9 ± 1.1	58.9 ± 1.3	3.09	12.8 ± 0.6						
1.05	38.5 ± 1.0	51.2 ± 1.2	60.3 ± 1.3	3.31	12.5 ± 0.6						
1.10	38.8 ± 1.0	51.5 ± 1.2	60.8 ± 1.3	3.58	12.2 ± 0.6						
1.15	38.3 ± 1.0	50.9 ± 1.2	60.2 ± 1.3	3.91	11.8 ± 0.6						
1.20	36.9 ± 1.0	49.3 ± 1.1	58.4 ± 1.3	4.21	11.5 ± 0.6						
1.25	35.5 ± 0.9	46.8 ± 1.1	55.4 ± 1.2								
1.30	32.5 ± 0.9	44.4 ± 1.1	51.4 ± 1.2								
1.35	29.1 ± 0.8	39.7 ± 1.0	47.8 ± 1.1								
1.40	25.6 ± 0.8	34.9 ± 0.9	43.0 ± 1.0								
1.45	21.1 ± 0.7	30.0 ± 0.9	36.9 ± 1.0								
1.50	17.4 ± 0.7	25.2 ± 0.8	31.6 ± 0.9								
1.55	14.3 ± 0.6	20.8 ± 0.7	26.2 ± 0.8								
1.60		17.3 ± 0.7	22.3 ± 0.7								
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