Appendices

Appendix 1: Properties of Gases

Gas	Chemical formula	Molar mass, kg/kmol	R, kJ/kgK	c_p, kJ/kgK	c_v, kJ/kgK	$\gamma = \frac{c_p}{c_v}$
Air	—	28.97	0.2870	1.004	0.717	1.400
Ammonia	NH_3	17.03	0.4882	2.130	1.642	1.297
Argon	Ar	39.95	0.2081	0.520	0.312	1.667
Butane	C_4H_{10}	58.12	0.1430	1.716	1.573	1.091
Carbon dioxide	CO_2	44.01	0.1889	0.842	0.653	1.289
Carbon monoxide	CO	28.01	0.2968	1.041	0.744	1.400
Ethane	C_2H_6	30.07	0.2765	1.766	1.490	1.186
Ethylene	C_2H_4	28.05	0.2964	1.548	1.252	1.237
Helium	He	4.00	2.0770	5.193	3.116	1.667
Hydrogen	H_2	2.02	4.1242	14.209	10.085	1.409
Methane	CH_4	16.04	0.5184	2.254	1.736	1.299
Neon	Ne	20.18	0.4120	1.030	0.618	1.667
Nitrogen	N_2	28.01	0.2968	1.042	0.745	1.400
Octane	C_8H_{18}	114.23	0.0728	1.711	1.638	1.044
Oxygen	O_2	32.00	0.2598	0.922	0.662	1.393
Propane	C_3H_8	44.10	0.1886	1.679	1.490	1.126
Water (steam)	H_2O	18.02	0.4615	1.872	1.410	1.327

Specific heats evaluated at 25 °C, 100 kPa

Energy, Entropy and Engines: An Introduction to Thermodynamics, First Edition. Sanjeev Chandra.

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