Table 1: Thermal properties of gases and liquids at 1 atm pressure and 293.15 K = 20° C = 68° F, similar to Thompson, Table F.2. (a) acetone, CH_3COCH_3 or 2-propanone, (b) biacetyl or diacetyl or 2,3 butadione.

Gas	Molecular Weight M	Gas Ct. R (J/kg/K)	Sp. Heat Ratio γ	Density ρ (kg/m^3)	Sound Speed c (m/s)	Sp. Heat C_P (J/kg/K)	Viscosity μ (Pa·s)	P_v (Torr)
He	4.0026	2077.2	1.667	0.1664	1007.4	5193	199e-7	
Ar	39.948	208.13	1.670	1.662	319.0	520.7	229e-7	
Xe	131.30	63.32	1.667	5.459	175.9			
H_2	2.014	4128.1	1.406	0.0837	1304.4	14,310	89.6e-7	
N_2	28.0134	296.80	1.401	1.165	349.1	1041	178.2e-7	
O_2	31.9988	259.83	1.397	1.332	320.5	920	207.2e-7	
Air	28.966	287.03	1.402	1.205	343.3	1007	184.6e-7	
CO	28.0106	296.83	1.402	1.165	349.1	1043	175e-7	
CO_2	44.0100	188.92	1.297	1.839	266.2	851	149e-7	
CH_4	16.0431	518.25	1.31	0.594	446.1	2237.7	112e-7	
CF_4	92.0367	90.34	1.16	3.673	173.3			
SF_6	146.05	56.93	1.092	6.074	134.96	674	1.45e-5	
C_3H_6O-a	58.08	143.1	1.0706	2.416	211.9	2174.6	3.1e-4	180
$C_4H_6O_2$-b	86.09	96.57	1.072?	3.581	174.2?	1435.7?		40
H_2O			1.006	998.2	1,484	4,182	1.002e-3	17.5
Hg			1.146	13,600	1,450	139	1.554e-3	≈ 0

Table 2: Dimensionless numbers, similar to Incropera, 2nd ed., Table 6.2. Thermal diffusivity, $\alpha = k/\rho/c_p$, Volumetric thermal expansion coefficient, β [1/K].

Name	Definition	Interpretation
Biot	$Bi \equiv \frac{hL}{k_s}$	Ratio of internal resistance of a solid to the boundary layer thermal resistance.
Friction Coefficient	$C_f \equiv \frac{\tau_s}{\rho V^2/2}$	Dimensionless surface shear stress.
Fourier	$Fo \equiv \frac{\alpha t}{L^2}$	Ratio of the heat conduction rate to the rate of thermal energy storage in a solid. Dimensionless time.
Friction factor	$f \equiv \frac{\Delta p}{(L/D)(\rho u_m^2/2)}$	Dimensionless pressure drop for internal flow.
Grashof	$Gr_L \equiv \frac{g\beta(T_s - T_\infty)L^3}{\nu^2}$	Ratio of buoyancy to viscous forces in the velocity boundary layer.
Nusselt	$Nu_L \equiv \frac{hL}{k_f}$	Dimensionless temperature gradient at the surface.
Prandtl	$Pr \equiv \frac{c_p \mu}{k} = \frac{\nu}{\alpha}$	Ratio of momentum and thermal diffusivities.
Rayleigh	$Ra_d \equiv \frac{g\beta(T_H - T_C)d^3}{\alpha\nu}$	Equivalent to the product of Gr and Pr.
Reynolds	$Re_L \equiv \frac{\rho V L}{\mu} = \frac{VL}{\nu}$	Ratio of inertial to viscous forces.
Weber	$We \equiv \frac{\rho V^2 L}{\sigma}$	Ratio of intertial to surface tension forces.

Universal Gas Constant	$\mathcal{R}$	8,314 J/(kg mol K) = 1.987 Btu/(lb mol °R)	1 kg = 2.2046 lbm
Gravity Proportionality	g_c	32.174 (lb$_m$/lb$_f$)(ft/s^2)	1 mi = 1.6093 km, 2.54 cm = 1 in
Avogadro's Number	$\mathcal{N}$	6.024×10^{23} molecules/mol	1 Nt = 0.2248 lbf
Planck's Constant	h	6.625×10^{-34} J·s	1 J = 0.73756 ft-lbf = 6.2415 MeV
Boltzmann's Constant	k	1.380×10^{-23} J/(K·molecule)	1 hp = 550 ft-lbf/s = 745.7 W
Stefan-Boltzman Constant	σ	5.67×10^{-8} W/(m^2 K^4)	
Vacuum speed of light	c_o	2.998×10^8 m/s	
gravity	g	9.807 m/s^2	
Sea level pressure	p	101,325 Pa	