

Appendix N: Unit Conversion Tables

Table N.1 Equivalence of Miscellaneous Units

Lengths					
1 ft	= 0.3048 m	= 12 in	= 0.3333 yd		
1 m	= 3.28084 ft	= 39.37008 in			
1 mi	= 5,280 ft	= 1,760 yd	= 1,609.34 m	= 1.60934 km	= 320 rd
Areas					
1 ft ²	= 0.09290 m ²	= 144 in ²	= 0.11111 yd ²		
1 m ²	= 1550 in ²	= 10.7639 ft ²	= 1.19599 yd ²		
1 acre	= 43,560 ft ²	= 4,840 yd ²	= 0.40469 ha (hectare)	= 4046.87 m ²	= 0.001563 mi ²
1 mi ²	= 640 acres	= 3,097,600 yd ²	= 2,589,988 m ²	= 2.5899 km ²	= 258.99 ha
1 km ²	= 0.38610 mi ²	= 247.104 acre	= 100 ha		
Masses and weights					
1 lb	= 0.45359 kg = 0.000464 long ton	= 16 oz	= 14.5833 oz (troy)	= 0.0005	ton = 7000 grains
1 kg	= 2.2046 lb av = 0.001 m ton	= 2.6792 lb tr (troy)	= 35.274 oz av	= 15,432.4 grains	= 0.00110 ton
1 ton	= 2,000 lb	= 907.185 kg	= 32,000 oz	= 0.90722 m ton	
Volume and capacity					
1 ft ³	= 1728 in ³ = 6.229 Imp gal (Br)	= 0.03704 yd ³ = 0.80356 bu	= 0.028317 m ³	= 29.9221 qt (liq)	= 7.4806 gal (liq)
1 yd ³	= 46,656 in ³ = 21.6962 bu (bushel)	= 27 ft ³	= 0.76456 m ³	= 807.896 qt (liq)	= 201.974 gal (liq)
1 gal (liq)	= 231 in ³	= 0.13368 ft ³	= 4 qt	= 0.83268 Imp gal	= 0.00378543 m ³
1 m ³	= 61,023 in ³ = 1.308 yd ³	= 35,314 ft ³	= 1056.7 qt (liq)	= 264.18 gal	= 28.38 bu

Table N.2 Conversion Factors for Thermal Conductivity

(Multiply units of left column by appropriate factor* in table to obtain results in units designated at top of vertical column)

	Btu/h-ft-°F	Btu-in/h-ft²-°F	W/m-°C	W/cm-°C	cal/s-cm-°C	kcal/h-m-°C
Btu/h-ft-°F	1.0000	12.000	1.72958	0.017296	4.13378 x E-03	1.48816
Btu-in/h-ft ² -°F	0.0833	1.000	0.14413	1.441314 x E-03	3.44481 x E-04	0.124013
W/m-°C	0.57818	6.9381	1.000	0.001	2.39006 x E-03	0.860422
W/cm-°C	57.8175	693.810	100.000	1.000	0.23901	86.0422
cal/s-cm-°C	241.9090	2902.91	418.40	4.18400	1.000	360.000
kcal/h-m-°C	0.671971	8.06365	1.16222	0.011622	2.77778 x E-03	1.000

Table N.3 Conversion Factors of Coefficients of Heat Transfer

(Multiply units of left column by appropriate factor* in table to obtain results in units designated at top of vertical column)

	Btu/h-ft²-°F	W/m²-°C	W/cm²-°C	kcal/h-m²-°C	cal/s-cm²-°C
Btu/h-ft ² -°F	1.0000	5.67446	5.67446 x E-04	4.88243	1.35623 x E-04
W/m ² -°C	0.17623	1.000	1.0 x E-04	0.86042	2.3900 x E-03
W/cm ² -°C	1762.28	1.0 x E+04	1.000	8604.20	0.2390
kcal/h-m ² -°C	0.20482	1.16222	1.16222 x E-04	1.000	2.77778
cal/s-cm ² -°C	7373.38	4.1840 x E-04	4.1840	3.6000	1.000

Table N.4 Conversion Factors for Energy

(Multiply units of left column by appropriate factor* in table to obtain results in units designated at top of vertical column)

	Btu	J	kWh	kcal	ft·lbf
Btu	1.0000	1054.350	2.92875 x E-04	0.251996	778.21
J	9.478 x E-04	1.0000	2.77778 x E-07	2.39006 x E-04	7.3756 x E-01
kWh	3414.43	3.6 x E+06	1.0000	860.420	2.6552 x E+06
kcal	3.9656	4184.0	1.16222 x E-03	1.0000	3086.54
hp·h	2547.16	2.6864 x E-06	0.7457	641.6	1.9808 x E-06
ft·lbf	1.28592 x E-03	1.355818	3.76616 x E-07	3.2405 x E-04	1.0000

Table N.5 Conversion Factors for Energy in Relation to Time and Area

(Multiply units of left column by appropriate factor* in table to obtain results in units designated at top of vertical column)

	Btu/h·ft²	Btu/h·m²	W/ft²	W/m²	kcal/h·m²	Btu/s·ft²
Btu/h·ft ²	1.0000	10.7639	0.29288	3.15248	2.71428	2.77778 x E-04
Btu/h·m ²	0.092903	1.0000	0.027209	0.29288	0.251996	2.58064 x E-05
W/ft ²	3.41443	36.7526	1.0000	10.76391	9.26142	9.48453 x E-04
W/m ²	0.31721	3.41442	0.092903	1.0000	0.86042	8.81138 x E-05
kcal/h·m ²	0.36867	3.96832	0.10797	1.16222	1.0000	1.02408 x E-04
Btu/s·ft ²	3600.0	38750.0	1054.35	11348.9	9764.85	1.0000

Table N.6 Miscellaneous Conversion Equivalents

	(lb/ft³)	(g/cm³)	(kg/m³)	(lb/gal)
lb/ft ³	1.000	= 0.0160185	= 16.01846	= 0.133680
g/cm ³	62.428	= 1.000	= 1000.0	= 8.34538
kg/m ³	0.062428	= 0.001	= 1.000	= 0.008345
lb/gal	7.4805	= 0.11982	= 119.82	= 1.000
Enthalpy and energy per unit mass				
	(Btu/lb)	(kcal/kg)	(J/g)	(w·h/kg)
Btu/lb	1.000	= 0.555556	= 2.32444	= 0.645679
kcal/kg	1.799	= 1.000	= 4.184	= 1.16222
J/g	0.430210	= 0.239006	= 1.000	= 0.277778
w·h/kg	1.54876	= 0.860422	= 3.600	= 1.000
Specific heat and entropy				
	(Btu/lb·°R)	(kcal/kg·°K)	(kJ/kg·°K)	(w·h/kg·°K)
kcal/kg·°K	1.000	= 1.000	= 4.184	= 1.16222
kJ/kg·°K	0.239006	= 0.239006	= 1.000	= 0.277778
w·h/kg·°K	0.860422	= 0.860422	= 3.600	= 1.000

Table N.7 Temperature Conversion

$^{\circ}\text{F} = (^{\circ}\text{C} \times 9/5) + 32$		$^{\circ}\text{C} = (^{\circ}\text{F} - 32) 5/9$							
$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$
-40	-40	200	93	440	227	680	360	920	493
-35	-37	205	96	445	229	685	363	925	496
-30	-34	210	99	450	232	690	366	930	499
-25	-32	215	102	455	235	695	368	935	502
-20	-29	220	104	460	238	700	371	940	504
-15	-26	225	107	465	241	705	374	945	507
-10	-23	230	110	470	243	710	377	950	510
-5	-21	235	113	475	246	715	379	955	513
0	-18	240	116	480	249	720	382	960	516
5	-15	245	118	485	252	725	385	965	518
10	-12	250	121	490	254	730	388	970	521
15	-9	255	124	495	257	735	391	975	524
20	-7	260	127	500	260	740	393	980	527
25	-4	265	129	505	263	745	396	985	529
30	-1	270	132	510	266	750	399	990	532
35	2	275	135	515	268	755	402	995	535
40	4	280	138	520	271	760	404	1000	538
45	7	285	141	525	274	765	407	1005	541
50	10	290	143	530	277	770	410	1010	543
55	13	295	146	535	279	775	413	1015	546
60	16	300	149	540	282	780	416	1020	549
65	18	305	152	545	285	785	418	1025	552
70	21	310	154	550	288	790	421	1030	554
75	24	315	157	555	291	795	424	1035	557
80	27	320	160	560	293	800	427	1040	560
85	29	325	163	565	296	805	429	1045	563
90	32	330	166	570	299	810	432	1050	566
95	35	335	168	575	302	815	435	1055	568
100	38	340	171	580	304	820	438	1060	571
105	41	345	174	585	307	825	441	1065	574
110	43	350	177	590	310	830	443	1070	577
115	46	355	179	595	313	835	446	1075	579
120	49	360	182	600	316	840	449	1080	582
125	52	365	185	605	318	845	452	1085	585
130	54	370	188	610	321	850	454	1090	588
135	57	375	191	615	324	855	457	1095	591
140	60	380	193	620	327	860	460	1100	593
145	63	385	196	625	329	865	463	1105	596
150	66	390	199	630	332	870	466	1110	599
155	68	395	202	635	335	875	468	1115	602
160	71	400	204	640	338	880	471	1120	604
165	74	405	207	645	341	885	474	1125	607
170	77	410	210	650	343	890	477	1130	610
175	79	415	213	655	346	895	479	1135	613
180	82	420	216	660	349	900	482	1140	616
185	85	425	218	665	352	905	485	1145	618
190	88	430	221	670	354	910	488	1150	621
195	91	435	224	675	357	915	491	1155	624