Conversion Factors

In these tables, factors for conversion, including conversions to the International System of Units (SI), are based on ASTM Standard for Metric Practice, E380-91. The latest edition of this publication should be studied for more detail on the SI system, including definitions and symbols.

In calculating derived factors in the tables that follow, exact conversions were used, when available, rather than the 7-digit round-offs listed in ASTM E380 conversion tables. Derived factors given below are rounded to the same number of significant digits as the source factors.

In any conversion of fundamental measurement units, some confusion may result due to redefinition of units used in earlier tables. For example, in 1959 a small refinement was made in the definition of the yard, which changed its length from 3600/3937 meter (or 1 inch = 25.4000508 mm) to 0.9144 m exactly (or 1 inch = 25.4 mm exactly). The tables below are based on the new definition, but one should be aware that where U.S. land measurements are concerned, the old relationship applies. Refer to ASTM E380-91, note 13, for more detail.

Similar confusion may arise in the definition of units for heat or energy. In the tables below, the Btu (IT) and calorie (IT) are used. These are the heat units recommended by the International Conference on the Properties of Steam, as defined:

1 Btu (IT) = 1055.055 852 62 joule (exactly)
1 Calorie (IT) = 4.186 800 joule (exactly)

For information only, other definitions that may be used elsewhere:

1 Btu (Mean) = 1055.87 joule
1 Btu (39°F) = 1059.67 joule
1 Btu (60°F) = 1054.68 joule
1 Btu (Thermochemical) = 1054.350 joule

1 calorie (Mean) = 4.190 02 joule
1 calorie (15°C) = 4.185 80 joule
1 calorie (20°C) = 4.181 90 joule
1 calorie (Thermochemical) = 4.184 000 joule

The fundamental relationship between the Btu and the calorie:

$$\frac{\text{gram–pound relationship}}{\text{Fahrenheit–Celsius scale relationship}}$$

or: $$\text{Btu} \times \frac{453.592\ 29}{1.8} = \text{calorie (IT, mean, or other)}$$

FIG. 1-2

Conversion Factor Tables

Velocity
(Length/unit of time)

ft/sec	ft/min	Miles/hr (U.S. Statute)	m/sec	m/min	km/hr
1	60	0.6818182	0.3048	18.288	1.09728
0.01666667	1	0.01136364	5.08×10^{-3}	0.3048	0.018288
1.466667	88	1	0.44704	26.8224	1.609344
3.280840	196.8504	2.236936	1	60	3.6
0.05468066	3.280840	0.03728227	0.016667	1	0.06
0.9113444	54.68066	0.6213712	0.2777778	16.66667	1

Energy

Ft-lbf	Kg-meter	Btu (IT)	Kilo-calorie (IT)	Hp-hr	Kilowatt-hr	joule (J)
1	0.1382550	1.285068×10^{-3}	3.238316×10^{-4}	5.050505×10^{-7}	3.766161×10^{-7}	1.355818
7.233014	1	9.294911×10^{-3}	2.342278×10^{-3}	3.653037×10^{-6}	2.724070×10^{-6}	9.806650
778.1692	107.5858	1	0.2519958	3.930148×10^{-4}	2.930711×10^{-4}	1055.056
3088.025	426.9348	3.968321	1	1.559609×10^{-3}	1.163×10^{-3}	4186.8
1980000	273744.8	2544.434	641.1865	1	0.7456999	2684520.
2655224	367097.8	3412.142	859.8452	1.341022	1	3600000.
0.7375621	0.1019716	9.478171×10^{-4}	2.388459×10^{-4}	3.725061×10^{-7}	2.777778×10^{-7}	1

FIG. 1-2 (Cont'd)

Conversion Factor Tables

Length

Inches	Feet	Yards	Miles (U.S. Statute)	Millimeters	Meters
1	0.08333333	0.02777778	1.578283×10^{-5}	25.4	0.0254
12	1	0.3333333	1.893939×10^{-4}	304.8	0.3048
36	3	1	5.681818×10^{-4}	914.4	0.9144
63360.	5280	1760	1	1609344	1609.344
0.03937008	3.280840×10^{-3}	1.093613×10^{-3}	6.213712×10^{-7}	1	0.001
39.37008	3.280840	1.093613	6.213712×10^{-4}	1000	1

Area

Sq inches	Sq feet	Sq yards	Acres	Sq miles (U.S. Statute)	Sq meters
1	6.944444×10^{-3}	7.716049×10^{-4}	1.594225×10^{-7}	2.490977×10^{-10}	6.4516×10^{-4}
144	1	0.1111111	2.295684×10^{-5}	3.587006×10^{-8}	9.290304×10^{-2}
1296	9	1	2.066116×10^{-4}	3.228306×10^{-7}	0.8361274
6272640.	43560.	4840.	1	0.0015625	4046.856
4014489600	27878400	3097600.	640	1	2589988.
1550.0031	10.76391	1.195990	2.471054×10^{-4}	3.861022×10^{-7}	1

Capacity–volume

Cu inches	Cu feet	Cu yards	Liters	Cu meters	U.S. gallons	Imp. gallons	Barrels (42 U.S. gal)
1	5.787037×10^{-4}	2.143347×10^{-5}	0.01638706	1.638706×10^{-5}	4.329004×10^{-3}	3.604649×10^{-3}	1.030715×10^{-4}
1728	1	0.03703704	28.31685	0.02831685	7.480520	6.228833	0.1781076
46656	27	1	764.5549	0.7645549	201.9740	168.1784	4.808905
61.02374	0.03531467	1.307951×10^{-3}	1	0.001	0.2641720	0.2199692	6.289810×10^{-3}
61023.74	35.31467	1.307951	1000	1	264.1720	219.9692	6.289810
231.0000	0.1336806	4.951132×10^{-3}	3.785412	0.003785412	1	0.8326739	2.380952×10^{-2}
277.4196	0.1605437	5.946064×10^{-3}	4.546092	0.004546092	1.200950	1	0.02859406
9702.001	5.614584	0.2079475	158.9873	0.1589873	42	34.97230	1

Mass

Ounces	Pounds	Short tons	Long tons	Kilograms	Metric tons
1	0.0625	3.125×10^{-5}	2.790179×10^{-5}	0.02834952	2.834950×10^{-5}
16	1	5×10^{-4}	4.464286×10^{-4}	0.4535924	4.535924×10^{-4}
32000	2000	1	0.8928571	907.1847	0.9071847
35840	2240	1.12	1	1016.047	1.016047
35.27396	2.204623	1.102311×10^{-3}	9.842065×10^{-4}	1	0.001
35273.96	2204.623	1.102311	0.9842065	1000	1

Weight per unit of area

Lb/sq ft	Lb/sq in	kg/sq cm	kg/sq m	Short tons/sq ft	Long tons/sq ft	kg/sq mm
1	0.006944444	4.882428×10^{-4}	4.882428	0.0005	4.464286×10^{-4}	4.882428×10^{-6}
144	1	0.07030695	703.0695	0.072	0.06428571	7.030695×10^{-4}
2048.161	14.22334	1	10000	1.024081	0.9143578	0.01
0.2048161	0.001422334	0.0001	1	1.024081×10^{-4}	9.143578×10^{-5}	0.000001
2000	13.88889	0.9764855	9764.855	1	0.8928571	0.009764855
2240	15.55556	1.093664	10936.64	1.12	1	0.01093664
204816.1	1422.334	100	1 000 000	102.4081	91.43578	1

Weight per unit of area, pressure

kgf/cm^2	kPa	lbf/in^2	Mm mercury (0°C)	in. mercury (32°F)	in. water (39.2°F)	atmospheres (standard)	Millibars
1	98.06650	14.22334	735.561	28.9591	393.712	0.9678411	980.6650
0.01019716	1	0.1450377	7.50064	0.295301	4.01474	0.009869233	10
0.07030695	6.894757	1	51.7151	2.03603	27.6807	0.06804596	68.94757
0.00135951	0.133322	0.0193367	1	0.0393701	0.535253	0.00131579	1.33322
0.0345315	3.38638	0.491153	25.4	1	13.5954	0.0334210	33.8638
0.00253993	0.249082	0.0361263	1.86827	0.0735541	1	0.00245825	2.49082
1.033227	101.3250	14.69595	760.002	29.9213	406.794	1	1013.250
0.001019716	0.1	0.01450377	0.750064	0.0295301	0.401474	9.869233×10^{-4}	1

FIG. 1-3

A.P.I. and Baumé Gravity Tables and Weight Factors

A.P.I. gravity	Baumé gravity	Specific gravity	Lb/ U.S. gal	U.S. gal/ lb	kg/ Cu Meter	Cu Meter/kg
0	10.2473	1.0760	8.9616	0.1116	1073.838	0.000931
1	9.2226	1.0679	8.8940	0.1124	1065.733	0.000938
2	8.1979	1.0599	8.8274	0.1133	1057.750	0.000945
3	7.1731	1.0520	8.7617	0.1141	1049.886	0.000952
4	6.1484	1.0443	8.6971	0.1150	1042.138	0.000960
5	5.1237	1.0366	8.6333	0.1158	1034.503	0.000967
6	4.0989	1.0291	8.5706	0.1167	1026.979	0.000974
7	3.0742	1.0217	8.5087	0.1175	1019.564	0.000981
8	2.0495	1.0143	8.4477	0.1184	1012.256	0.000988
9	1.0247	1.0071	8.3876	0.1192	1005.051	0.000995
10	10.0000	1.0000	8.3283	0.1201	997.948	0.001002
11	10.9894	0.9930	8.2698	0.1209	990.945	0.001009
12	11.9788	0.9861	8.2122	0.1218	984.039	0.001016
13	12.9682	0.9792	8.1554	0.1226	977.229	0.001023
14	13.9576	0.9725	8.0993	0.1235	970.513	0.001030
15	14.9470	0.9659	8.0440	0.1243	963.888	0.001037
16	15.9364	0.9593	7.9895	0.1252	957.354	0.001045
17	16.9258	0.9529	7.9357	0.1260	950.907	0.001052
18	17.9152	0.9465	7.8826	0.1269	944.546	0.001059
19	18.9046	0.9402	7.8302	0.1277	938.270	0.001066
20	19.8940	0.9340	7.7786	0.1286	932.077	0.001073
21	20.8834	0.9279	7.7276	0.1294	925.965	0.001080
22	21.8728	0.9218	7.6772	0.1303	919.933	0.001087
23	22.8622	0.9159	7.6275	0.1311	913.978	0.001094
24	23.8516	0.9100	7.5785	0.1320	908.101	0.001101
25	24.8410	0.9042	7.5300	0.1328	902.298	0.001108
26	25.8304	0.8984	7.4822	0.1336	896.569	0.001115
27	26.8198	0.8927	7.4350	0.1345	890.913	0.001122
28	27.8092	0.8871	7.3884	0.1353	885.327	0.001130
29	28.7986	0.8816	7.3424	0.1362	879.811	0.001137
30	29.7880	0.8762	7.2969	0.1370	874.363	0.001144
31	30.7774	0.8708	7.2520	0.1379	868.982	0.001151
32	31.7668	0.8654	7.2077	0.1387	863.668	0.001158
33	32.7562	0.8602	7.1638	0.1396	858.417	0.001165
34	33.7456	0.8550	7.1206	0.1404	853.231	0.001172
35	34.7350	0.8498	7.0778	0.1413	848.106	0.001179
36	35.7244	0.8448	7.0355	0.1421	843.043	0.001186
37	36.7138	0.8398	6.9938	0.1430	838.039	0.001193
38	37.7032	0.8348	6.9525	0.1438	833.095	0.001200
39	38.6926	0.8299	6.9117	0.1447	828.209	0.001207
40	39.6820	0.8251	6.8714	0.1455	823.380	0.001215
41	40.6714	0.8203	6.8316	0.1464	818.607	0.001222
42	41.6608	0.8156	6.7922	0.1472	813.888	0.001229
43	42.6502	0.8109	6.7533	0.1481	809.224	0.001236
44	43.6396	0.8063	6.7148	0.1489	804.613	0.001243
45	44.6290	0.8017	6.6768	0.1498	800.055	0.001250
46	45.6184	0.7972	6.6392	0.1506	795.547	0.001257
47	46.6078	0.7927	6.6020	0.1515	791.090	0.001264
48	47.5972	0.7883	6.5652	0.1523	786.683	0.001271
49	48.5866	0.7839	6.5288	0.1532	782.325	0.001278
50	49.5760	0.7796	6.4928	0.1540	778.015	0.001285
51	50.5654	0.7753	6.4573	0.1549	773.751	0.001292
52	51.5548	0.7711	6.4221	0.1557	769.535	0.001299
53	52.5442	0.7669	6.3873	0.1566	765.364	0.001307
54	53.5336	0.7628	6.3528	0.1574	761.238	0.001314
55	54.5230	0.7587	6.3188	0.1583	757.156	0.001321
56	55.5124	0.7547	6.2851	0.1591	753.118	0.001328
57	56.5018	0.7507	6.2517	0.1600	749.123	0.001335
58	57.4912	0.7467	6.2187	0.1608	745.170	0.001342
59	58.4806	0.7428	6.1861	0.1617	741.258	0.001349
60	59.4700	0.7389	6.1538	0.1625	737.387	0.001356
61	60.4594	0.7351	6.1218	0.1633	733.557	0.001363
62	61.4488	0.7313	6.0902	0.1642	729.766	0.001370
63	62.4382	0.7275	6.0589	0.1650	726.014	0.001377
64	63.4276	0.7238	6.0279	0.1659	722.300	0.001384
65	64.4170	0.7201	5.9972	0.1667	718.624	0.001392
66	65.4064	0.7165	5.9668	0.1676	714.986	0.001399
67	66.3958	0.7128	5.9368	0.1684	711.384	0.001406
68	67.3852	0.7093	5.9070	0.1693	707.818	0.001413
69	68.3746	0.7057	5.8776	0.1701	704.288	0.001420
70	69.3640	0.7022	5.8484	0.1710	700.792	0.001427
71	70.3534	0.6988	5.8195	0.1718	697.332	0.001434
72	71.3428	0.6953	5.7909	0.1727	693.905	0.001441
73	72.3322	0.6919	5.7626	0.1735	690.512	0.001448
74	73.3216	0.6886	5.7346	0.1744	687.152	0.001455
75	74.3110	0.6852	5.7068	0.1752	683.824	0.001462
76	75.3004	0.6819	5.6793	0.1761	680.528	0.001469
77	76.2898	0.6787	5.6520	0.1769	677.265	0.001477
78	77.2792	0.6754	5.6251	0.1778	674.032	0.001484
79	78.2686	0.6722	5.5983	0.1786	670.830	0.001491
80	79.2580	0.6690	5.5719	0.1795	667.658	0.001498
81	80.2473	0.6659	5.5457	0.1803	664.516	0.001505
82	81.2367	0.6628	5.5197	0.1812	661.404	0.001512
83	82.2261	0.6597	5.4939	0.1820	658.320	0.001519
84	83.2155	0.6566	5.4685	0.1829	655.265	0.001526
85	84.2049	0.6536	5.4432	0.1837	652.239	0.001533
86	85.1943	0.6506	5.4182	0.1846	649.240	0.001540
87	86.1837	0.6476	5.3934	0.1854	646.268	0.001547
88	87.1731	0.6446	5.3688	0.1863	643.324	0.001554
89	88.1625	0.6417	5.3445	0.1871	640.407	0.001562
90	89.1519	0.6388	5.3203	0.1880	637.515	0.001569
91	90.1413	0.6360	5.2964	0.1888	634.650	0.001576
92	91.1307	0.6331	5.2727	0.1897	631.811	0.001583
93	92.1201	0.6303	5.2492	0.1905	628.996	0.001590
94	93.1095	0.6275	5.2259	0.1914	626.207	0.001597
95	94.0989	0.6247	5.2029	0.1922	623.442	0.001604
96	95.0883	0.6220	5.1800	0.1930	620.702	0.001611
97	96.0777	0.6193	5.1573	0.1939	617.985	0.001618
98	97.0671	0.6166	5.1349	0.1947	615.293	0.001625
99	98.0565	0.6139	5.1126	0.1956	612.623	0.001632
100	99.0459	0.6112	5.0905	0.1964	609.977	0.001639

The relation of Degrees Baumé or A.P.I. to Relative Density is expressed by the following formulas:

For liquids lighter than water:

$$\text{Degrees Baumé} = \frac{140}{G} - 130, \qquad G = \frac{140}{130 + \text{Degrees Baumé}}$$

$$\text{Degrees A.P.I.} = \frac{141.5}{G} - 131.5, \qquad G = \frac{141.5}{131.5 + \text{Degrees A.P.I.}}$$

For liquids heavier than water:

$$\text{Degrees Baumé} = 145 - \frac{145}{G}, \qquad G = \frac{145}{145 + \text{Degrees Baumé}}$$

G = Relative Density = ratio of the weight of a given volume of oil at 15.56°C to the weight of the same volume of water at 15.56°C.

The above tables are based on the weight of 1 U.S. gallon (3.785 liters) of oil with a volume of 231 cubic inches (3785 cubic centimeters) at 60°F (15.56°C) in air at 760 mm pressure and 50% humidity. Assumed weight of 1 U.S. gallon of water at 60°F in air is 8.32828 pounds (3.77764 kg).

To determine the resulting gravity by mixing oils of different gravities:

$$D = \frac{m d_1 + n d_2}{m + n}$$

D = Density or Specific Gravity of mixture
m = Volume proportion of oil of d_1 density
n = Volume proportion of oil of d_2 density
d_1 = Specific Gravity of m oil
d_2 = Specific Gravity of n oil

FIG. 1-4

Values of the Gas Constant R in PV = nRT

Basis of units listed below is 22.4140 liters at 0°C and 1 atm for the volume of 1 g mole. All other values calculated from conversion factors listed in tables.

n	Temperature	Pressure	Volume	R	n	Temperature	Energy	R
gm mol	K	atm	liter	0.082 057 477	gm mol	K	calorie	1.985 9
gm mol	K	atm	cm^3	82.057	gm mol	K	joule	8.314 5
gm mol	K	mm Hg	liter	62.364				
gm mol	K	bar	liter	0.083 145	lb mol	°R	Btu	1.985 9
gm mol	K	kg/cm^2	liter	0.084 784	lb mol	°R	hp-hr	0.000 780 48
gm mol	K	kPa	m^3	0.008 314 5	lb mol	°R	Kw-hr	0.000 582 00
lb mol	°R	atm	ft^3	0.730 24	lb mol	°R	ft-lb	1 545.3
lb mol	°R	in.Hg	ft^3	21.850				
lb mol	°R	mm Hg	ft^3	554.98	k mol	K	joule	8 314.5
lb mol	°R	lb/in^2	ft^3	10.732				
lb mol	°R	lb/ft^2	ft^3	1 545.3				
lb mol	K	atm	ft^3	1.3144				
lb mol	K	mm Hg	ft^3	998.97				
k mol	K	kPa	m^3	8.3145				
k mol	K	bar	m^3	0.083 145				

FIG. 1-5

Commercial Base Pressure Conversion Factors

(Factors to Convert to Other Base Pressures)

Given base pressure (See notes 1&2)	13.9	14.65	101.325 kPa @ 15°C	760 mm Hg or 14.696	14.696 @ 59°F	14.7	14.73	14.73 Sat.	30" Hg	14.9	15.025	16.4
13.9	1.0000	0.9488	0.9440	0.9458	0.9440	0.9456	0.9437	0.9603	0.9434	0.9329	0.9251	0.8476
14.65	1.0540	1.0000	0.9950	0.9969	0.9950	0.9966	0.9946	1.0122	0.9943	0.9832	0.9750	0.8933
101.325 kPa @ 15°C	1.0593	1.0050	1.0000	1.0019	1.0000	1.0016	0.9996	1.0173	0.9993	0.9882	0.9800	0.8978
14.696 or 760 mm Hg	1.0573	1.0031	0.9981	1.0000	0.9981	0.9997	0.9977	1.0153	0.9974	0.9863	0.9781	0.8960
14.696 @ 59°F	1.0593	1.0050	1.0000	1.0019	1.0000	1.0016	0.9996	1.0173	0.9993	0.9882	0.9800	0.8978
14.7	1.0576	1.0034	0.9984	1.0003	0.9984	1.0000	0.9980	1.0156	0.9976	0.9866	0.9784	0.8963
14.73	1.0597	1.0055	1.0004	1.0023	1.0004	1.0020	1.0000	1.0177	0.9997	0.9886	0.9804	0.8982
14.73 Sat.	1.0413	0.9880	0.9830	0.9849	0.9830	0.9846	0.9826	1.0000	0.9823	0.9714	0.9633	0.8826
30" Hg	1.0601	1.0058	1.0007	1.0026	1.0007	1.0024	1.0003	1.0180	1.0000	0.9889	0.9807	0.8984
14.9	1.0719	1.0171	1.0119	1.0139	1.0119	1.0136	1.0115	1.0294	1.0112	1.0000	0.9917	0.9085
15.025	1.0809	1.0256	1.0204	1.0224	1.0204	1.0221	1.0200	1.0381	1.0197	1.0084	1.0000	0.9162
16.4	1.1795	1.1195	1.1138	1.1159	1.1138	1.1156	1.1134	1.1331	1.1130	1.1007	1.0915	1.0000

$$\text{Factor} = \frac{\text{Given Base Pressure}}{\text{Other Base Pressure}} \times \frac{\text{Other Base Temperature}}{\text{Given Base Temperature}}$$

Example: 14.65 to 14.73, 60°F

$$\left(\frac{14.65}{14.73}\right) \times \frac{459.67 + 60}{459.67 + 60} = 0.9946$$

FIG. 1-6

Pressure Equivalents

psia	in.Hg @ 32°F	mm Hg @ 0°C	kPa
1	2.03603	51.7151	6.8948
0.491153	1	25.400	3.38638
0.019337	0.3937	1	0.1333
0.14504	0.2953	7.5006	1
13.9	28.3008	718.8399	95.83772
14.65	29.82784	757.62621	101.00882
14.696	29.9215	760.0051	101.32598
14.6959	29.9213	760.00	101.3250
14.7	29.9296	760.21197	101.3536
14.73	29.9907	761.7634	101.5604
14.73456	30.00	761.999	101.5918
14.9	30.3368	770.55499	102.73252
15.025	30.59135	777.01937	103.5944
16.4	33.39532	848.12764	113.0747

FIG. 1-7

Viscosity Relationships

$$\text{Kinematic viscosity (centistokes)} = \frac{\text{absolute viscosity (centipoises)}}{\text{density (g/cm}^3\text{)*}}$$

$$\text{ft}^2/\text{sec} = (\text{centistokes})(1.07639 \times 10^{-5})$$

$$\text{centistokes} = (\text{ft}^2/\text{sec})(92903.4)$$

* Usually same as specific gravity.

APPROXIMATE VISCOSITY CONVERSIONS

ft^2/sec (50–100 SSU)	=	$[(\text{SSU})(2.433 \times 10^{-6})] - (0.00210/\text{SSU})$
ft^2/sec (100–350 SSU)	=	$[(\text{SSU})(2.368 \times 10^{-6})] - (0.00145/\text{SSU})$
ft^2/sec (over 350 SSU)	=	$[\text{SSU (at 100°F)}\ (2.3210 \times 10^{-6})]$
centistokes (50–100 SSU)	=	[(SSU) (0.226)] – (205.3/SSU)
centistokes (100–350 SSU)	=	[(SSU) (0.220)] – (147.7/SSU)
centistokes (over 350 SSU)	=	[SSU (at 100°F or 37.8°C) (0.21576)]
centistokes (over 350 SSU)	=	[SSU (at 210°F or 98.9°C) (0.21426)]
centistokes (over 500 SSU)	=	[SSU (at 122°F or 50°C) (2.120)]
centistokes (over 300 Redwood #1)	=	[Redwood #1 (Standard) (0.255)]
centistokes (over 50 Redwood #2)	=	[Redwood #2 (Admiralty) (2.3392)]
centistokes (over 18 Engler)	=	(Engler) (7.389)
centistokes (over 20 Stormer)	=	(Stormer) (2.802)
centistokes (over 1.0 Demler #10)	=	(Demler #10) (31.506)
centistokes (over 1.3 Demler #1)	=	(Demler #1) (3.151)
centistokes (over 14 Parlin #20)	=	(Parlin Cup #20) (61.652)
centistokes (over 230 Ford #4)	=	(Ford Cup #4) (3.753)
centistokes	=	6200 Barbey

VISCOSITY – UNIT CONVERSIONS

KINEMATIC VISCOSITY

MULTIPLY	BY	TO OBTAIN
ft^2/sec	92903.04	centistokes
ft^2/sec	0.092903	sq meters/sec
sq meters/sec	10.7639	ft^2/sec
sq meters/sec	1 000 000.0	centistokes
centistokes	0.000 001	sq meters/sec
centistokes	0.000 010 763 9	ft^2/sec

ABSOLUTE OR DYNAMIC VISCOSITY

lbf-sec/ft^2	47880.26	centipoises
lbf-sec/ft^2	47.8803	Pascal-sec
centipoises	0.000 102	kg-sec/sq meter
centipoises	0.000 020 885 4	lbf-sec/sq ft*
centipoises	0.001	Pascal-sec
Pascal-sec	0.020 885 4	lbf-sec/sq ft
Pascal-sec	1000	centipoises

* Sometimes absolute viscosity is given in terms of pounds mass. In this case — (centipoises)(0.000672) = lbm/ft • sec.

ABSOLUTE TO KINEMATIC VISCOSITY

centipoises	1/density (g/cm^3)	centistokes
centipoises	0.000 671 97/density (lb/ft^3)	ft^2/sec
lbf-sec/ft^2	32.174/density (lb/ft^3)	ft^2/sec
kg-sec/m^2	9.80665/density (kg/m^3)	sq meters/sec
Pascal-sec	1000/density (g/cm^3)	centistokes

KINEMATIC TO ABSOLUTE VISCOSITY

centistokes	density (g/cm^3)	centipoises
sq meters/sec	(0.10197)[density (kg/m^3)]	kg-sec/sq meter
ft^2/sec	(0.03108) [density (lb/ft^3)]	lbf-sec/ft^2
ft^2/sec	(1488.16) [density (lb/ft^3)]	centipoises
centistokes	(0.001) [density (g/cm^3)]	Pascal-sec
sq meters/sec	(1000) [density (g/cm^3)]	Pascal-sec