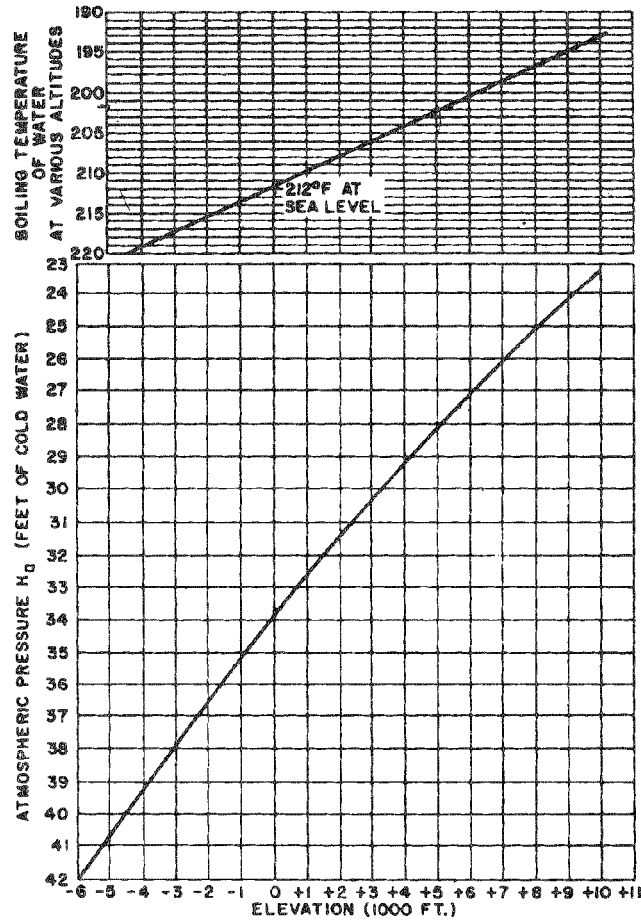
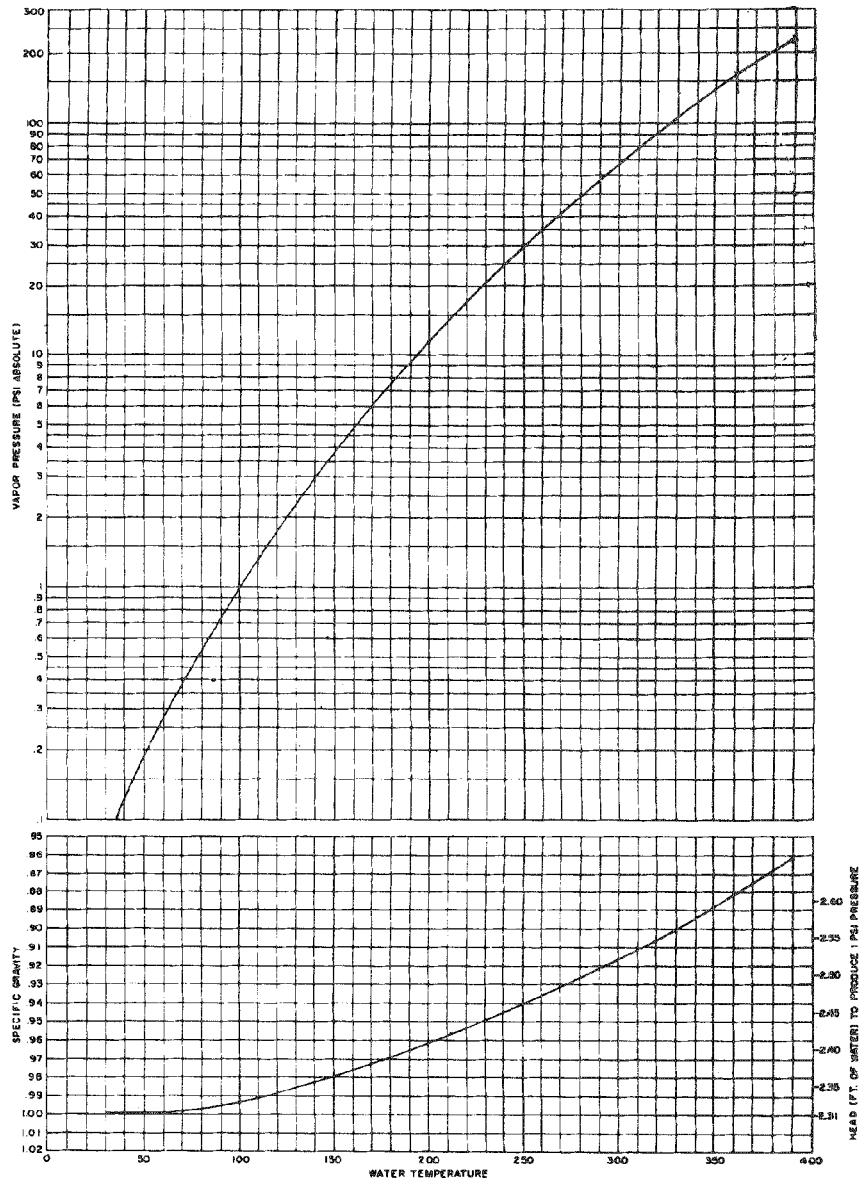


منحنی ۱-۱: تغییرات فشار هوا و نقطه جوش آب با زاء تغییرات ارتفاع



منحنی ۱-۲: تغییرات وزن مخصوص و فشار بخار آب بازاء تغییرات دما



جدول ۱-۱: خواص ترمودینامیکی آب در حالت اشباع

Fahr. Temp. (F)	Absolute Pressure $p \times 10^4$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb/Sq In.	In. Hg	Sat. Solid $v_i$	Evap. $v_{ig} \times 10^{-4}$	Sat. Vapor $v_g \times 10^{-4}$	Sat. Solid $h_i$	Evap. $h_{ig}$	Sat. Vapor $h_g$	Sat. Solid $s_i$	Evap. $s_{ig}$	Sat. Vapor $s_g$	
-180	0.004945	0.01005	0.01722	36070	36070	-232.05	1212.43	990.38	-0.4907	4.0458	3.8549	-180
-155	0.009040	0.01840	0.01723	20060	20060	-220.44	1213.02	992.58	-0.4854	3.9812	3.8258	-155
-150	0.01620	0.03298	0.01723	11390	11390	-218.82	1213.62	994.80	-0.4801	3.9188	3.8387	-150
-145	0.02850	0.05803	0.01721	6577	6577	-217.17	1214.17	997.00	-0.4748	3.8583	3.8305	-145
-140	0.04925	0.1003	0.01724	3884	3884	-215.49	1214.70	999.21	-0.4695	3.7966	3.8301	-140
-135	0.08390	0.1706	0.01725	2308	2308	-213.90	1215.22	1001.42	-0.4643	3.7428	3.8285	-135
-130	0.1403	0.2858	0.01725	1400	1400	-212.08	1215.71	1003.63	-0.4590	3.6974	3.8254	-130
-125	0.2312	0.4708	0.01726	862.2	862.2	-210.34	1216.18	1005.84	-0.4538	3.6538	3.1800	-125
-120	0.3757	0.7649	0.01726	538.6	538.6	-208.58	1216.63	1008.05	-0.4485	3.5815	3.1330	-120
-115	0.6019	1.226	0.01727	341.1	341.1	-206.79	1217.05	1010.26	-0.4433	3.5308	3.0875	-115
-110	0.9517	1.938	0.01728	218.9	218.9	-204.98	1217.45	1012.47	-0.4381	3.4815	3.0434	-110
-105	1.486	3.025	0.01728	142.2	142.2	-203.14	1217.82	1014.68	-0.4329	3.4336	3.0006	-105
-100	2.291	4.654	0.01729	93.82	93.82	-201.28	1218.17	1016.89	-0.4277	3.3868	2.9591	-100
-95	3.491	7.108	0.01729	62.23	62.23	-199.40	1218.50	1019.10	-0.4225	3.3412	2.9187	-95
-90	5.290	10.711	0.01730	41.86	41.86	-197.49	1218.80	1021.31	-0.4173	3.2969	2.8796	-90
-85	7.841	15.96	0.01730	28.46	28.46	-195.56	1219.08	1023.52	-0.4121	3.2536	2.8415	-85
-80	11.57	23.55	0.01731	19.55	19.55	-193.60	1219.33	1025.73	-0.4069	3.2114	2.8045	-80
-75	16.89	34.39	0.01732	13.56	13.56	-191.62	1219.56	1027.94	-0.4017	3.1702	2.7685	-75
-70	24.43	49.74	0.01732	9.501	9.501	-189.61	1219.76	1030.15	-0.3965	3.1301	2.7336	-70
-65	35.01	71.28	0.01733	6.715	6.715	-187.58	1219.94	1032.36	-0.3914	3.0910	2.6996	-65
-60	49.72	101.2	0.01734	4.789	4.789	-185.52	1220.10	1034.56	-0.3862	3.0525	2.6664	-60
-55	70.01	142.4	0.01734	3.443	3.443	-183.44	1220.23	1036.79	-0.3810	3.0152	2.6342	-55
-50	97.76	199.0	0.01735	2.498	2.498	-181.34	1220.34	1039.00	-0.3758	2.9785	2.6028	-50
-48	111.6	227.0	0.01736	2.200	2.200	-180.49	1220.37	1039.88	-0.3738	2.9643	2.5905	-48
-46	127.0	258.8	0.01736	1.941	1.941	-179.64	1220.40	1040.76	-0.3717	2.9501	2.5784	-46
-44	144.4	294.0	0.01736	1.715	1.715	-178.78	1220.43	1041.65	-0.3696	2.9359	2.5663	-44
-42	164.1	334.0	0.01736	1.516	1.516	-177.92	1220.45	1042.53	-0.3676	2.9219	2.5543	-42
-40	186.1	379.0	0.01737	1.343	1.343	-177.06	1220.48	1043.42	-0.3655	2.9080	2.5428	-40
-38	211.0	429.8	0.01737	1.191	1.191	-176.19	1220.49	1044.30	-0.3634	2.8942	2.5306	-38
-36	238.8	488.2	0.01737	1.057	1.057	-175.32	1220.51	1045.19	-0.3614	2.8807	2.5193	-36
-34	270.0	549.7	0.01737	0.9391	0.9391	-174.45	1220.52	1046.07	-0.3593	2.8671	2.5078	-34
-32	304.0	620.8	0.01738	0.8355	0.8355	-173.57	1220.52	1046.96	-0.3573	2.8538	2.4965	-32

Fahr. Temp. (F)	Absolute Pressure $p \times 10^2$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb/Sq In.	In. Hg	Sat. Solid $v_i$	Evap. $v_{ig} \times 10^{-4}$	Sat. Vapor $v_g \times 10^{-4}$	Sat. Solid $h_i$	Evap. $h_{ig}$	Sat. Vapor $h_g$	Sat. Solid $s_i$	Evap. $s_{ig}$	Sat. Vapor $s_g$	
-30	0.3440	0.7003	0.01738	7.441	7.441	-172.68	1220.52	1047.84	-0.3552	2.8406	2.4853	-30
-28	0.3876	0.7891	0.01738	6.634	6.634	-171.80	1220.52	1048.72	-0.3532	2.8274	2.4742	-28
-26	0.4383	0.8882	0.01738	5.821	5.821	-170.91	1220.51	1049.60	-0.3511	2.8143	2.4632	-26
-24	0.4905	0.9987	0.01739	5.290	5.290	-170.01	1220.50	1050.49	-0.3490	2.8013	2.4523	-24
-22	0.5509	1.122	0.01739	4.732	4.732	-169.19	1220.49	1051.37	-0.3470	2.7885	2.4415	-22
-20	0.6181	1.259	0.01739	4.237	4.237	-168.21	1220.47	1052.26	-0.3449	2.7757	2.4306	-20
-19	0.6545	1.333	0.01739	4.011	4.011	-167.78	1220.46	1052.70	-0.3439	2.7695	2.4256	-19
-18	0.6928	1.410	0.01740	3.797	3.797	-167.31	1220.45	1053.14	-0.3429	2.7632	2.4203	-18
-17	0.7332	1.493	0.01740	3.596	3.596	-166.85	1220.43	1053.58	-0.3418	2.7568	2.4150	-17
-16	0.7757	1.579	0.01740	3.407	3.407	-166.40	1220.42	1054.02	-0.3408	2.7506	2.4096	-16
-15	0.8204	1.670	0.01740	3.228	3.228	-165.94	1220.41	1054.47	-0.3398	2.7444	2.4046	-15
-14	0.8676	1.766	0.01740	3.060	3.060	-165.48	1220.39	1054.91	-0.3388	2.7383	2.3996	-14
-13	0.9172	1.867	0.01740	2.901	2.901	-165.03	1220.38	1055.35	-0.3377	2.7320	2.3943	-13
-12	0.9694	1.974	0.01740	2.750	2.750	-164.57	1220.36	1055.79	-0.3367	2.7259	2.3892	-12
-11	1.024	2.086	0.01740	2.609	2.609	-164.11	1220.34	1056.23	-0.3357	2.7198	2.3841	-11
-10	1.082	2.203	0.01741	2.475	2.475	-163.66	1220.32	1056.67	-0.3347	2.7138	2.3791	-10
-9	1.143	2.327	0.01741	2.349	2.349	-163.18	1220.30	1057.12	-0.3336	2.7076	2.3740	-9
-8	1.207	2.457	0.01741	2.229	2.229	-162.72	1220.28	1057.56	-0.3326	2.7015	2.3690	-8
-7	1.274	2.594	0.01741	2.116	2.116	-162.26	1220.26	1058.00	-0.3316	2.6956	2.3640	-7
-6	1.344	2.737	0.01741	2.010	2.010	-161.79	1220.23	1058.44	-0.3306	2.6898	2.3590	-6
-5	1.419	2.888	0.01741	1.909	1.909	-161.33	1220.21	1058.88	-0.3295	2.6836	2.3541	-5
-4	1.496	3.047	0.01742	1.814	1.814	-160.86	1220.18	1059.32	-0.3285	2.6777	2.3492	-4
-3	1.578	3.213	0.01742	1.723	1.723	-160.39	1220.16	1059.76	-0.3275	2.6718	2.3443	-3
-2	1.664	3.388	0.01742	1.638	1.638	-159.92	1220.13	1060.21	-0.3264	2.6658	2.3394	-2
-1	1.754	3.572	0.01742	1.557	1.557	-159.45	1220.10	1060.65	-0.3254	2.6600	2.3346	-1
0	1.849	3.764	0.01742	1.481	1.481	-158.98	1220.07	1061.09	-0.3244	2.6541	2.3297	0
1	1.948	3.966	0.01742	1.408	1.408	-158.51	1220.04	1061.53	-0.3234	2.6483	2.3249	1
2	2.052	4.178	0.01742	1.340	1.340	-158.04	1220.01	1061.97	-0.3224	2.6425	2.3201	2
3	2.161	4.400	0.01743	1.275	1.275	-157.56	1219.97	1062.41	-0.3213	2.6367	2.3154	3
4	2.276	4.633	0.01743	1.214	1.214	-157.09	1219.94	1062.85	-0.3203	2.6309	2.3106	4
5	2.396	4.878	0.01743	1.155	1.155	-156.61	1219.90	1063.29	-0.3193	2.6252	2.3058	5
6	2.521	5.134	0.01743	1.100	1.100	-156.14	1219.88	1063.74	-0.3182	2.6194	2.3012	6

Compiled by John A. Goff and B. Gratch.

ادامه دارد...

دنباله جدول ۱-۱

Fahr. Temp. (F)	Absolute Pressure $p$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (Lb) (°F)			Fahr. Temp. (F)
	Lb/Sq in.	In. Hg	Sat. Solid $v_f$	Evap. $v_{fg}$	Sat. Vapor $v_g$	Sat. Solid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Solid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
7	0.02053	0.05492	0.01743	10480	10480	-155.60	1219.84	1064.18	-0.3172	2.6138	2.2966	7
8	0.02791	0.05883	0.01743	9979	9979	-155.18	1219.80	1064.62	-0.3182	2.6081	2.2919	8
9	0.02936	0.05977	0.01744	9507	9507	-154.70	1219.76	1065.06	-0.3182	2.6028	2.2873	9
10	0.03087	0.06286	0.01744	9060	9060	-154.22	1219.72	1065.50	-0.3182	2.5969	2.2827	10
11	0.03246	0.06608	0.01744	8636	8636	-153.74	1219.68	1065.94	-0.3131	2.5912	2.2781	11
12	0.03412	0.06946	0.01744	8234	8234	-153.26	1219.64	1066.38	-0.3121	2.5857	2.2736	12
13	0.03585	0.07300	0.01744	7851	7851	-152.77	1219.59	1066.82	-0.3111	2.5801	2.2690	13
14	0.03767	0.07669	0.01744	7489	7489	-152.29	1219.55	1067.26	-0.3101	2.5746	2.2645	14
15	0.03957	0.08056	0.01744	7144	7144	-151.80	1219.50	1067.70	-0.3090	2.5690	2.2600	15
16	0.04156	0.08461	0.01745	6817	6817	-151.32	1219.46	1068.14	-0.3080	2.5635	2.2555	16
17	0.04363	0.08884	0.01745	6505	6505	-150.83	1219.41	1068.58	-0.3070	2.5581	2.2511	17
18	0.04581	0.09326	0.01745	6210	6210	-150.34	1219.36	1069.02	-0.3060	2.5526	2.2466	18
19	0.04809	0.09789	0.01745	5929	5929	-149.85	1219.31	1069.46	-0.3049	2.5471	2.2422	19
20	0.05045	0.1027	0.01745	5662	5662	-149.36	1219.26	1069.90	-0.3039	2.5417	2.2378	20
21	0.05293	0.1078	0.01745	5408	5408	-148.87	1219.21	1070.34	-0.3029	2.5364	2.2334	21
22	0.05552	0.1130	0.01746	5166	5166	-148.38	1219.16	1070.78	-0.3019	2.5310	2.2291	22
23	0.05823	0.1186	0.01746	4936	4936	-147.88	1219.10	1071.22	-0.3008	2.5256	2.2248	23
24	0.06105	0.1243	0.01746	4717	4717	-147.39	1219.05	1071.66	-0.2998	2.5203	2.2205	24
25	0.06400	0.1303	0.01746	4509	4509	-146.89	1218.99	1072.09	-0.2988	2.5150	2.2162	25
26	0.06708	0.1366	0.01746	4311	4311	-146.40	1218.93	1072.53	-0.2978	2.5097	2.2119	26
27	0.07030	0.1431	0.01746	4122	4122	-145.90	1218.87	1072.97	-0.2968	2.5045	2.2077	27
28	0.07365	0.1500	0.01746	3943	3943	-145.40	1218.81	1073.41	-0.2957	2.4991	2.2034	28
29	0.07715	0.1571	0.01747	3771	3771	-144.90	1218.75	1073.85	-0.2947	2.4939	2.1992	29
30	0.08080	0.1645	0.01747	3608	3608	-144.40	1218.69	1074.29	-0.2937	2.4887	2.1950	30
31	0.08461	0.1723	0.01747	3453	3453	-143.90	1218.63	1074.73	-0.2927	2.4835	2.1908	31
32	0.08858	0.1803	0.01747	3305	3305	-143.40	1218.56	1075.16	-0.2916	2.4783	2.1867	32
33	0.088586	0.18036	0.01602	3304.6	3304.6	0.00	1075.16	1075.16	0.00000	2.1867	2.1867	33*

Fahr. Temp. (F)	Absolute Pressure $p_s$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (Lb) (°F)			Fahr. Temp. (F)
	Lb/Sq in.	In. Hg	Sat. Liquid $v_f$	Evap. $v_{fg}$	Sat. Vapor $v_g$	Sat. Liquid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Liquid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
33	0.092227	0.18778	0.01602	3180.5	3180.5	1.01	1074.59	1075.60	0.00205	2.1811	2.1831	33
34	0.095996	0.19546	0.01602	3061.7	3061.7	2.01	1074.03	1075.04	0.00409	2.1755	2.1796	34
35	0.099908	0.20342	0.01602	2947.8	2947.8	3.02	1073.46	1075.46	0.00612*	2.1700	2.1761	35
36	0.10396	0.21166	0.01602	2838.7	2838.7	4.02	1072.90	1075.92	0.00815	2.1644	2.1726	36
37	0.10815	0.22020	0.01602	2734.1	2734.1	5.03	1072.33	1076.38	0.01018	2.1589	2.1661	37
38	0.11249	0.22904	0.01602	2633.8	2633.8	6.03	1071.77	1076.80	0.01220	2.1535	2.1657	38
39	0.11699	0.23819	0.01602	2537.6	2537.6	7.04	1071.20	1077.24	0.01422	2.1480	2.1622	39
40	0.12164	0.24767	0.01602	2445.4	2445.4	8.04	1070.64	1077.68	0.01623	2.1426	2.1588	40
41	0.12646	0.25748	0.01602	2356.9	2356.9	9.05	1070.06	1078.11	0.01824	2.1372	2.1554	41
42	0.13145	0.26763	0.01602	2272.0	2272.0	10.05	1069.50	1078.55	0.02024	2.1318	2.1520	42
43	0.13660	0.27813	0.01602	2190.5	2190.5	11.05	1068.94	1078.99	0.02224	2.1265	2.1487	43
44	0.14194	0.28899	0.01602	2112.3	2112.3	12.06	1068.37	1079.43	0.02423	2.1211	2.1453	44
45	0.14748	0.30023	0.01602	2037.3	2037.3	13.06	1067.81	1079.87	0.02622	2.1158	2.1420	45
46	0.15317	0.31185	0.01602	1965.2	1965.2	14.05	1067.24	1080.30	0.02820	2.1105	2.1387	46
47	0.15907	0.32387	0.01602	1896.0	1896.0	15.05	1066.68	1080.74	0.03018	2.1052	2.1354	47
48	0.16517	0.33629	0.01602	1829.5	1829.5	16.07	1066.11	1081.18	0.03216	2.0999	2.1321	48
49	0.17148	0.34913	0.01602	1765.7	1765.7	17.07	1065.55	1081.62	0.03413	2.0947	2.1288	49
50	0.17799	0.36240	0.01602	1704.3	1704.3	18.07	1064.99	1082.06	0.03610	2.0895	2.1256	50
51	0.18473	0.37611	0.01602	1645.4	1645.4	19.07	1064.42	1082.49	0.03808	2.0842	2.1223	51
52	0.19169	0.39028	0.01602	1588.7	1588.7	20.07	1063.86	1082.93	0.04002	2.0791	2.1191	52
53	0.19888	0.40492	0.01603	1534.3	1534.3	21.07	1063.30	1083.37	0.04197	2.0739	2.1159	53
54	0.20630	0.42003	0.01603	1481.9	1481.9	22.08	1062.72	1083.80	0.04392	2.0688	2.1127	54
55	0.21397	0.43564	0.01603	1431.5	1431.5	23.08	1062.16	1084.24	0.04587	2.0637	2.1096	55
56	0.22188	0.45176	0.01603	1383.1	1383.1	24.08	1061.60	1084.68	0.04781	2.0586	2.1064	56
57	0.23006	0.46840	0.01603	1336.5	1336.5	25.08	1061.04	1085.12	0.04975	2.0535	2.1033	57
58	0.23849	0.48558	0.01603	1291.7	1291.7	26.08	1060.47	1085.55	0.05168	2.0485	2.1002	58
59	0.24720	0.50330	0.01603	1248.6	1248.6	27.08	1059.91	1085.99	0.05361	2.0434	2.0970	59
60	0.25618	0.52160	0.01603	1207.1	1207.1	28.08	1059.34	1086.42	0.05553	2.0385	2.0940	60
61	0.26545	0.54047	0.01604	1167.2	1167.2	29.08	1058.78	1086.86	0.05746	2.0334	2.0909	61
62	0.27502	0.55994	0.01604	1128.7	1128.7	30.08	1058.22	1087.30	0.05937	2.0284	2.0878	62
63	0.28489	0.58002	0.01604	1091.7	1091.7	31.08	1057.65	1087.73	0.06129	2.0233	2.0848	63
64	0.29505	0.60073	0.01604	1056.1	1056.1	32.08	1057.09	1088.17	0.06320	2.0186	2.0818	64
65	0.30554	0.62209	0.01604	1021.7	1021.7	33.08	1056.52	1088.60	0.06510	2.0136	2.0787	65
66	0.31636	0.64411	0.01604	988.63	988.63	34.07	1055.97	1089.04	0.06700	2.0087	2.0757	66
67	0.32750	0.66681	0.01605	956.78	956.78	35.07	1055.40	1089.47	0.06890	2.0038	2.0728	67
68	0.33900	0.69021	0.01605	926.08	926.08	36.07	1054.84	1089.91	0.07080	1.9990	2.0698	68
69	0.35084	0.71432	0.01605	896.47	896.47	37.07	1054.27	1090.34	0.07269	1.9941	2.0668	69
70	0.36304	0.73916	0.01605	867.95	867.95	38.07	1053.71	1090.78	0.07458	1.9893	2.0639	70
71	0.37561	0.76476	0.01605	840.45	840.45	39.07	1053.14	1091.21	0.07646	1.9845	2.0610	71

\* Compiled by John A. Goff and S. Gratch.  
 \* Extrapolated to represent metastable equilibrium with undercooled liquid.

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Fahr. Temp. (F)	Absolute Pressure p		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb/Sq In.	In. Hg	Sat. Liquid v <sub>f</sub>	Evap. v <sub>fg</sub>	Sat. Vapor v <sub>g</sub>	Sat. Liquid h <sub>f</sub>	Evap. h <sub>fg</sub>	Sat. Vapor h <sub>g</sub>	Sat. Liquid s <sub>f</sub>	Evap. s <sub>fg</sub>	Sat. Vapor s <sub>g</sub>	
72	0.38866	0.79113	0.01608	813.98	813.97	60.07	1052.58	1092.65	0.07834	1.9797	2.0580	73
73	0.40190	0.81829	0.01608	788.38	788.40	41.07	1052.01	1093.08	0.08022	1.9749	2.0551	73
74	0.41564	0.84576	0.01608	763.77	763.77	42.05	1051.46	1093.52	0.08209	1.9701	2.0522	74
75	0.42979	0.87506	0.01608	739.65	739.97	43.06	1050.86	1093.95	0.08398	1.9654	2.0494	75
76	0.44435	0.90472	0.01608	717.01	717.03	44.06	1050.32	1094.38	0.08582	1.9607	2.0465	76
77	0.45935	0.93521	0.01607	694.88	694.90	45.06	1049.76	1094.82	0.08769	1.9560	2.0437	77
78	0.47478	0.96666	0.01607	673.52	673.54	46.06	1049.19	1095.25	0.08951	1.9513	2.0408	78
79	0.49066	0.99900	0.01607	652.91	652.93	47.06	1048.62	1095.68	0.09140	1.9465	2.0380	79
80	0.50701	1.0323	0.01607	633.01	633.03	48.05	1048.07	1096.12	0.09325	1.9419	2.0352	80
81	0.52382	1.0665	0.01608	613.90	613.92	49.05	1047.50	1096.55	0.09510	1.9373	2.0324	81
82	0.54113	1.1017	0.01608	595.25	595.27	50.05	1046.93	1096.98	0.09694	1.9328	2.0297	82
83	0.55892	1.1380	0.01608	577.34	577.36	51.05	1046.37	1097.42	0.09878	1.9281	2.0269	83
84	0.57722	1.1752	0.01608	560.01	560.06	52.05	1045.80	1097.85	0.10062	1.9236	2.0242	84
85	0.59604	1.2136	0.01609	543.33	543.35	53.05	1045.23	1098.29	0.10246	1.9191	2.0214	85
86	0.61540	1.2533	0.01609	527.19	527.21	54.04	1044.67	1098.71	0.10429	1.9144	2.0187	86
87	0.63530	1.2935	0.01609	511.60	511.62	55.04	1044.10	1099.14	0.10611	1.9099	2.0160	87
88	0.65575	1.3351	0.01610	496.52	496.54	56.04	1043.54	1099.58	0.10794	1.9054	2.0133	88
89	0.67678	1.3779	0.01610	481.98	481.98	57.04	1042.97	1100.01	0.10978	1.9009	2.0106	89
90	0.69838	1.4219	0.01610	467.99	467.99	58.04	1042.40	1100.44	0.11159	1.8964	2.0079	90
91	0.72059	1.4671	0.01610	454.26	454.28	59.03	1041.84	1100.87	0.11339	1.8919	2.0053	91
92	0.74340	1.5136	0.01611	441.10	441.12	60.03	1041.27	1101.30	0.11520	1.8874	2.0026	92
93	0.76684	1.5613	0.01611	428.33	428.40	61.03	1040.70	1101.73	0.11701	1.8830	2.0000	93
94	0.79091	1.6103	0.01611	416.07	416.09	62.03	1040.13	1102.16	0.11881	1.8786	1.9974	94
95	0.81664	1.6607	0.01612	404.17	404.19	63.03	1039.56	1102.59	0.12061	1.8741	1.9947	95
96	0.84403	1.7124	0.01612	392.65	392.67	64.02	1039.00	1103.02	0.12241	1.8698	1.9922	96
97	0.86711	1.7655	0.01612	381.51	381.53	65.02	1038.43	1103.45	0.12420	1.8654	1.9896	97
98	0.89388	1.8200	0.01612	370.73	370.75	66.02	1037.86	1103.88	0.12600	1.8610	1.9870	98
99	0.92137	1.8759	0.01613	360.30	360.32	67.02	1037.29	1104.31	0.12778	1.8566	1.9844	99
100	0.94959	1.9334	0.01613	350.20	350.22	68.02	1036.72	1104.74	0.12957	1.8523	1.9819	100
101	0.97854	1.9923	0.01614	340.42	340.44	69.01	1036.16	1105.17	0.13135	1.8480	1.9793	101
102	1.00823	2.0529	0.01614	330.95	330.97	70.01	1035.59	1105.59	0.13313	1.8437	1.9768	102
103	1.03868	2.1149	0.01614	321.80	321.82	71.01	1035.01	1106.02	0.13490	1.8394	1.9743	103
104	1.07000	2.1786	0.01614	312.93	312.95	72.01	1034.44	1106.45	0.13667	1.8351	1.9718	104
105	1.1021	2.2440	0.01615	304.34	304.36	73.01	1033.87	1106.88	0.13844	1.8309	1.9693	105
106	1.1351	2.3110	0.01615	295.02	295.04	74.01	1033.29	1107.30	0.14021	1.8266	1.9668	106
107	1.1688	2.3798	0.01616	287.96	287.98	75.00	1032.73	1107.73	0.14197	1.8224	1.9644	107

Fahr. Temp. (F)	Absolute Pressure p		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb/Sq In.	In. Hg	Sat. Liquid v <sub>f</sub>	Evap. v <sub>fg</sub>	Sat. Vapor v <sub>g</sub>	Sat. Liquid h <sub>f</sub>	Evap. h <sub>fg</sub>	Sat. Vapor h <sub>g</sub>	Sat. Liquid s <sub>f</sub>	Evap. s <sub>fg</sub>	Sat. Vapor s <sub>g</sub>	
108	1.2035	2.4503	0.01616	280.14	280.16	76.00	1032.16	1108.15	0.14373	1.8182	1.9619	108
109	1.2380	2.5226	0.01616	272.58	272.60	77.00	1031.58	1108.58	0.14549	1.8140	1.9595	109
110	1.2744	2.5968	0.01617	265.24	265.26	78.00	1031.01	1109.01	0.14724	1.8098	1.9570	110
111	1.3128	2.6728	0.01617	258.14	258.16	79.00	1030.44	1109.44	0.14899	1.8056	1.9546	111
112	1.3510	2.7507	0.01617	251.25	251.27	80.00	1029.86	1109.86	0.15074	1.8015	1.9522	112
113	1.3902	2.8306	0.01618	244.57	244.59	80.99	1029.30	1110.29	0.15248	1.7973	1.9498	113
114	1.4305	2.9125	0.01618	238.10	238.12	81.99	1028.72	1110.71	0.15423	1.7932	1.9474	114
115	1.4717	2.9963	0.01618	231.82	231.84	82.99	1028.15	1111.14	0.15596	1.7890	1.9450	115
116	1.5139	3.0823	0.01619	225.73	225.75	83.99	1027.57	1111.56	0.15770	1.7849	1.9426	116
117	1.5571	3.1703	0.01619	219.83	219.85	84.99	1027.00	1111.98	0.15943	1.7809	1.9403	117
118	1.6014	3.2606	0.01620	214.10	214.12	85.99	1026.42	1112.41	0.16116	1.7767	1.9379	118
119	1.6468	3.3530	0.01620	208.54	208.56	86.98	1025.85	1112.83	0.16289	1.7727	1.9356	119
120	1.6933	3.4477	0.01620	203.16	203.18	87.98	1025.28	1113.26	0.16461	1.7687	1.9333	120
121	1.7409	3.5446	0.01621	197.93	197.95	88.98	1024.70	1113.68	0.16631	1.7647	1.9310	121
122	1.7897	3.6439	0.01621	192.85	192.87	89.98	1024.12	1114.10	0.16801	1.7606	1.9286	122
123	1.8396	3.7455	0.01622	187.93	187.95	90.98	1023.54	1114.52	0.16977	1.7565	1.9264	123
124	1.8907	3.8496	0.01622	183.15	183.17	91.98	1022.96	1114.94	0.17148	1.7525	1.9241	124
125	1.9430	3.9561	0.01622	178.51	178.53	92.98	1022.39	1115.37	0.17319	1.7485	1.9219	125
126	1.9964	4.0651	0.01623	174.00	174.02	93.98	1021.81	1115.79	0.17490	1.7445	1.9195	126
127	2.0514	4.1768	0.01623	169.63	169.65	94.97	1021.24	1116.21	0.17660	1.7407	1.9173	127
128	2.1075	4.2910	0.01624	165.38	165.40	95.97	1020.66	1116.63	0.17830	1.7367	1.9150	128
129	2.1649	4.4078	0.01624	161.26	161.28	96.97	1020.09	1117.05	0.18000	1.7328	1.9128	129
130	2.2237	4.5274	0.01625	157.25	157.27	97.97	1019.52	1117.47	0.18170	1.7288	1.9106	130
131	2.2838	4.6498	0.01625	153.38	153.38	98.97	1018.92	1117.89	0.18339	1.7250	1.9084	131
132	2.3452	4.7750	0.01626	149.59	149.60	99.97	1018.34	1118.31	0.18508	1.7211	1.9062	132
133	2.4081	4.9030	0.01626	145.91	145.93	100.97	1017.74	1118.73	0.18676	1.7172	1.9040	133
134	2.4725	5.0340	0.01626	142.34	142.36	101.97	1017.15	1119.15	0.18845	1.7134	1.9018	134
135	2.5382	5.1679	0.01627	138.97	138.97	102.97	1016.59	1119.56	0.19013	1.7095	1.8998	135
136	2.6055	5.3049	0.01627	135.50	135.52	103.97	1016.01	1119.98	0.19181	1.7056	1.8974	136
137	2.6743	5.4450	0.01628	132.22	132.24	104.97	1015.43	1120.40	0.19348	1.7016	1.8953	137
138	2.7446	5.5881	0.01628	129.04	129.06	105.97	1014.85	1120.82	0.19516	1.6977	1.8931	138
139	2.8164	5.7345	0.01629	125.94	125.95	106.97	1014.26	1121.23	0.19683	1.6942	1.8910	139
140	2.8900	5.8842	0.01629	122.94	122.96	107.96	1013.69	1121.65	0.19850	1.6903	1.8888	140
141	2.9651	6.0371	0.01630	120.01	120.03	108.96	1013.11	1122.07	0.20016	1.6865	1.8867	141
142	3.0419	6.1934	0.01630	117.16	117.18	109.96	1012.52	1122.48	0.20182	1.6828	1.8846	142
143	3.1204	6.3532	0.01631	114.40	114.42	110.96	1011.94	1122.90	0.20348	1.6790	1.8825	143

\* Compiled by John A. Goff and S. Gratch.

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Fahr. Temp. (F)	Absolute Pressure $p$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb./Sq. In.	In. Hg	Sat. Liquid $v_f$	Evap. $v_{fg}$	Sat. Vapor $v_g$	Sat. Liquid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Liquid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
144	3.2006	6.5164	0.01631	111.70	111.72	111.96	1011.36	1123.31	0.20514	1.6753	1.8804	144
145	3.2825	6.6822	0.01632	109.99	109.11	112.96	1010.77	1123.73	0.20679	1.6715	1.8783	145
146	3.3562	6.8506	0.01632	108.54	106.56	113.96	1010.18	1124.14	0.20845	1.6678	1.8763	146
147	3.4517	7.0277	0.01633	104.06	104.08	114.96	1009.59	1124.56	0.21010	1.6641	1.8742	147
148	3.5360	7.2056	0.01633	101.65	101.67	115.96	1009.01	1124.97	0.21174	1.6604	1.8721	148
149	3.6282	7.3872	0.01634	99.306	99.322	116.96	1008.42	1125.38	0.21339	1.6567	1.8701	149
150	3.7194	7.5727	0.01634	97.022	97.038	117.96	1007.83	1125.79	0.21503	1.6530	1.8680	150
151	3.8124	7.7622	0.01635	94.799	94.815	118.96	1007.24	1126.20	0.21667	1.6493	1.8660	151
152	3.9074	7.9556	0.01635	92.635	92.651	119.96	1006.66	1126.62	0.21830	1.6457	1.8640	152
153	4.0044	8.1532	0.01636	90.528	90.544	120.97	1006.06	1127.03	0.21994	1.6421	1.8620	153
154	4.1035	8.3549	0.01636	88.477	88.493	121.97	1005.47	1127.44	0.22157	1.6384	1.8600	154
155	4.2045	8.5607	0.01637	86.480	86.498	122.97	1004.88	1127.85	0.22320	1.6348	1.8580	155
156	4.3078	8.7708	0.01637	84.536	84.552	123.97	1004.29	1128.26	0.22482	1.6312	1.8560	156
157	4.4132	8.9853	0.01637	82.642	82.658	124.97	1003.70	1128.67	0.22645	1.6276	1.8540	157
158	4.5207	9.2042	0.01638	80.798	80.814	125.97	1003.11	1129.08	0.22807	1.6239	1.8520	158
159	4.6304	9.4276	0.01639	79.001	79.017	126.97	1002.52	1129.48	0.22969	1.6204	1.8501	159
160	4.7424	9.6556	0.01639	77.251	77.267	127.97	1001.92	1129.89	0.23130	1.6168	1.8481	160
161	4.8566	9.8882	0.01640	75.546	75.562	128.97	1001.33	1130.30	0.23292	1.6132	1.8462	161
162	4.9732	10.126	0.01640	73.885	73.901	129.97	1000.74	1130.71	0.23453	1.6097	1.8442	162
163	5.0921	10.368	0.01641	72.267	72.283	130.98	1000.15	1131.11	0.23614	1.6062	1.8423	163
164	5.2134	10.615	0.01642	70.690	70.706	131.98	999.56	1131.52	0.23774	1.6027	1.8404	164
165	5.3372	10.867	0.01642	69.153	69.169	132.98	998.97	1131.92	0.23935	1.5992	1.8384	165
166	5.4634	11.124	0.01643	67.654	67.670	133.98	998.38	1132.33	0.24095	1.5956	1.8365	166
167	5.5921	11.386	0.01643	66.194	66.210	134.98	997.79	1132.73	0.24255	1.5920	1.8346	167
168	5.7233	11.653	0.01644	64.770	64.786	135.98	997.20	1133.14	0.24414	1.5885	1.8326	168
169	5.8572	11.925	0.01644	63.382	63.398	136.98	996.61	1133.54	0.24573	1.5852	1.8307	169
170	5.9938	12.203	0.01645	62.028	62.044	137.98	996.02	1133.94	0.24732	1.5817	1.8287	170
171	6.1328	12.487	0.01645	60.710	60.726	138.98	995.43	1134.35	0.24892	1.5782	1.8271	171
172	6.2746	12.775	0.01646	59.423	59.439	139.99	994.84	1134.75	0.25051	1.5746	1.8253	172
173	6.4192	13.070	0.01647	58.168	58.184	141.00	994.25	1135.15	0.25209	1.5710	1.8234	173
174	6.5666	13.370	0.01647	56.944	56.960	142.00	993.66	1135.55	0.25367	1.5674	1.8216	174
175	6.7168	13.676	0.01648	55.750	55.766	143.00	993.07	1135.95	0.25525	1.5644	1.8197	175
176	6.8699	13.987	0.01648	54.586	54.602	144.00	992.48	1136.35	0.25683	1.5611	1.8179	176
177	7.0259	14.305	0.01649	53.450	53.466	145.00	991.89	1136.75	0.25841	1.5577	1.8161	177

Fahr. Temp. (F)	Absolute Pressure $p_s$		Specific Volume, cu ft per lb			Enthalpy, Btu per lb			Entropy, Btu per (lb) (°F)			Fahr. Temp. (F)
	Lb./Sq. In.	In. Hg	Sat. Liquid $v_f$	Evap. $v_{fg}$	Sat. Vapor $v_g$	Sat. Liquid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Liquid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
178	7.1840	14.629	0.01650	52.341	52.357	146.01	991.30	1137.15	0.25998	1.5543	1.8143	178
179	7.3469	14.959	0.01650	51.260	51.276	147.01	990.71	1137.55	0.26155	1.5508	1.8124	179
180	7.5119	15.295	0.01651	50.203	50.220	148.01	990.12	1137.94	0.26312	1.5473	1.8106	180
181	7.6801	15.637	0.01651	49.173	49.190	149.02	989.53	1138.34	0.26469	1.5438	1.8087	181
182	7.8514	15.986	0.01652	48.168	48.185	150.02	988.94	1138.74	0.26625	1.5403	1.8069	182
183	8.0258	16.341	0.01652	47.187	47.204	151.02	988.35	1139.14	0.26781	1.5373	1.8053	183
184	8.2035	16.703	0.01653	46.229	46.246	152.03	987.76	1139.53	0.26937	1.5341	1.8035	184
185	8.3845	17.071	0.01653	45.294	45.311	153.03	987.17	1139.92	0.27093	1.5308	1.8017	185
186	8.5688	17.446	0.01654	44.381	44.398	154.04	986.58	1140.32	0.27248	1.5275	1.8000	186
187	8.7565	17.829	0.01654	43.489	43.506	155.04	986.00	1140.71	0.27403	1.5242	1.7982	187
188	8.9476	18.218	0.01655	42.619	42.636	156.05	985.41	1141.11	0.27557	1.5209	1.7965	188
189	9.1422	18.614	0.01655	41.769	41.786	157.05	984.82	1141.50	0.27713	1.5176	1.7947	189
190	9.3403	19.017	0.01655	40.939	40.956	158.05	984.23	1141.89	0.27868	1.5143	1.7930	190
191	9.5420	19.428	0.01656	40.128	40.145	159.06	983.64	1142.28	0.28022	1.5111	1.7913	191
192	9.7473	19.846	0.01656	39.337	39.354	160.06	983.05	1142.67	0.28176	1.5078	1.7896	192
193	9.9563	20.271	0.01656	38.563	38.580	161.06	982.46	1143.06	0.28330	1.5045	1.7878	193
194	10.169	20.704	0.01657	37.807	37.824	162.07	981.87	1143.45	0.28484	1.5013	1.7861	194
195	10.386	21.145	0.01657	37.069	37.086	163.07	981.28	1143.84	0.28638	1.4980	1.7844	195
196	10.606	21.594	0.01658	36.348	36.365	164.08	980.69	1144.23	0.28791	1.4949	1.7828	196
197	10.830	22.050	0.01658	35.643	35.660	165.08	980.10	1144.62	0.28944	1.4917	1.7811	197
198	11.058	22.515	0.01659	34.954	34.971	166.09	979.51	1145.00	0.29097	1.4884	1.7794	198
199	11.290	22.987	0.01659	34.281	34.298	167.09	978.92	1145.39	0.29250	1.4852	1.7777	199
200	11.526	23.468	0.01660	33.623	33.640	168.10	978.33	1145.78	0.29402	1.4820	1.7760	200
201	11.767	23.957	0.01660	32.980	32.997	169.11	977.74	1146.16	0.29554	1.4788	1.7744	201
202	12.011	24.455	0.01661	32.351	32.368	170.11	977.15	1146.54	0.29706	1.4756	1.7727	202
203	12.260	24.961	0.01661	31.737	31.754	171.12	976.56	1146.93	0.29858	1.4725	1.7711	203
204	12.513	25.476	0.01662	31.136	31.153	172.12	975.97	1147.31	0.30010	1.4693	1.7694	204
205	12.770	26.000	0.01662	30.546	30.563	173.13	975.38	1147.69	0.30161	1.4662	1.7678	205
206	13.031	26.532	0.01663	29.974	29.991	174.14	974.79	1148.08	0.30312	1.4631	1.7662	206
207	13.297	27.074	0.01663	29.413	29.430	175.14	974.20	1148.46	0.30463	1.4600	1.7646	207
208	13.568	27.625	0.01664	28.863	28.880	176.15	973.61	1148.84	0.30614	1.4568	1.7629	208
209	13.843	28.185	0.01664	28.326	28.343	177.16	973.02	1149.22	0.30765	1.4536	1.7613	209
210	14.123	28.754	0.01665	27.801	27.818	178.17	972.43	1149.60	0.30915	1.4505	1.7597	210
211	14.407	29.333	0.01665	27.287	27.304	179.17	971.84	1150.00	0.31065	1.4474	1.7581	211
212	14.696	29.921	0.01666	26.784	26.801	180.18	971.25	1150.39	0.31215	1.4444	1.7565	212

\* Compiled by John A. Coff and B. Gratch.

ادامه دارد...

دنباله جدول ۱-۱

Fahr. Temp. (F)	Abs. Press. lb/Sq In. p	Specific Volume		Enthalpy			Entropy			Fahr. Temp. (F)
		Sat. Liquid $v_f$	Sat. Vapor $v_g$	Sat. Liquid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Liquid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
212	14.698	0.016716	26.80	180.16	970.3	1150.5	0.31213	1.4446	1.7567	212
214	15.291	.016729	25.83	182.17	969.1	1151.2	.31513	1.4384	1.7535	214
216	15.903	.016743	24.90	184.18	967.8	1152.0	.31811	1.4322	1.7504	216
218	16.535	.016758	24.00	186.20	966.5	1152.7	.32109	1.4261	1.7472	218
220	17.188	.016772	23.15	188.22	965.3	1153.5	.32406	1.4201	1.7441	220
222	17.861	.016786	22.33	190.24	964.0	1154.2	.32702	1.4140	1.7410	222
224	18.557	.016801	21.55	192.26	962.7	1154.9	.32998	1.4080	1.7380	224
226	19.275	.016816	20.80	194.28	961.4	1155.7	.33292	1.4020	1.7349	226
228	20.015	.016830	20.08	196.30	960.1	1156.4	.33586	1.3961	1.7319	228
230	20.78	.016845	19.386	198.32	958.8	1157.1	.33880	1.3901	1.7289	230
232	21.57	0.016860	18.723	200.34	957.5	1157.9	0.34172	1.3842	1.7260	232
234	22.38	.016875	18.087	202.37	956.2	1158.6	.34464	1.3784	1.7230	234
236	23.22	.016891	17.476	204.39	954.9	1159.3	.34755	1.3725	1.7201	236
238	24.08	.016906	16.890	206.42	953.6	1160.0	.35045	1.3667	1.7172	238
240	24.97	.016922	16.327	208.44	952.3	1160.7	.35335	1.3609	1.7143	240
242	25.88	.016937	15.786	210.47	950.9	1161.4	.35624	1.3552	1.7114	242
244	26.82	.016953	15.267	212.49	949.6	1162.1	.35912	1.3494	1.7085	244
246	27.79	.016969	14.767	214.52	948.3	1162.8	.36199	1.3437	1.7057	246
248	28.79	.016985	14.287	216.55	947.0	1163.5	.36486	1.3380	1.7029	248
250	29.82	.017001	13.826	218.59	945.6	1164.2	.36772	1.3324	1.7001	250
252	30.88	0.017017	13.382	220.62	944.3	1164.9	0.37058	1.3267	1.6973	252
254	31.97	.017034	12.955	222.65	942.9	1165.6	.37342	1.3211	1.6945	254
256	33.09	.017050	12.544	224.68	941.6	1166.2	.37626	1.3155	1.6918	256
258	34.24	.017067	12.149	226.72	940.2	1166.9	.37910	1.3100	1.6891	258
260	35.42	.017084	11.768	228.76	938.8	1167.6	.38193	1.3044	1.6864	260
262	36.64	.017101	11.402	230.79	937.5	1168.3	.38475	1.2989	1.6837	262
264	37.89	.017118	11.049	232.83	936.1	1168.9	.38756	1.2935	1.6810	264
266	39.17	.017135	10.709	234.87	934.7	1169.6	.39037	1.2880	1.6784	266
268	40.49	.017152	10.382	236.91	933.3	1170.2	.39317	1.2825	1.6757	268
270	41.85	.017170	10.066	238.95	932.0	1170.9	.39597	1.2771	1.6731	270
272	43.24	0.017187	9.762	241.00	930.6	1171.6	0.39876	1.2717	1.6705	272
274	44.67	.017205	9.469	243.04	929.2	1172.2	.40154	1.2664	1.6679	274
276	46.13	.017223	9.186	245.08	927.8	1172.8	.40432	1.2610	1.6653	276
278	47.64	.017241	8.913	247.13	926.3	1173.5	.40709	1.2557	1.6628	278
280	49.18	.017259	8.650	249.18	924.9	1174.1	.40986	1.2504	1.6602	280
282	50.77	.017277	8.397	251.23	923.5	1174.7	.41262	1.2451	1.6577	282
284	52.40	.017296	8.152	253.28	922.1	1175.4	.41537	1.2398	1.6552	284
286	54.07	.017314	7.915	255.33	920.6	1176.0	.41812	1.2346	1.6527	286
288	55.78	.017333	7.687	257.38	919.2	1176.6	.42086	1.2293	1.6502	288
290	57.53	.017352	7.467	259.44	917.8	1177.2	.42360	1.2241	1.6477	290
292	59.33	0.017371	7.254	261.50	916.3	1177.8	0.42633	1.2189	1.6453	292
294	61.17	.017390	7.048	263.55	914.9	1178.4	.42906	1.2138	1.6428	294
296	63.06	.017409	6.849	265.61	913.4	1179.0	.43178	1.2086	1.6404	296
298	65.00	.017429	6.657	267.67	911.9	1179.6	.43449	1.2035	1.6380	298
300	66.98	.017448	6.472	269.73	910.4	1180.2	.43720	1.1984	1.6356	300
310	77.64	.017548	5.632	280.06	903.0	1183.0	.45067	1.1731	1.6238	310
320	89.60	.017652	4.919	290.43	895.3	1185.8	.46400	1.1483	1.6123	320
330	103.00	.017760	4.312	300.84	887.5	1188.4	.47722	1.1238	1.6010	330
340	117.93	.017872	3.792	311.30	879.5	1190.8	.49031	1.0997	1.5901	340
350	134.53	.017988	3.346	321.80	871.3	1193.1	.50329	1.0760	1.5793	350
360	152.92	0.018108	2.961	332.35	862.9	1195.2	0.51617	1.0526	1.5688	360
370	173.23	.018233	2.628	342.96	854.2	1197.2	.52894	1.0295	1.5585	370
380	195.60	.018363	2.339	353.62	845.4	1199.0	.54163	1.0067	1.5483	380
390	220.2	.018498	2.087	364.34	836.2	1200.6	.55422	0.9841	1.5383	390
400	247.1	.018638	1.8661	375.12	826.8	1202.0	.56672	.9617	1.5284	400
410	276.5	.018784	1.6726	385.97	817.2	1203.1	.57916	.9395	1.5187	410
420	308.5	.018936	1.5024	396.89	807.2	1204.1	.59152	.9175	1.5091	420
430	343.3	.019094	1.3521	407.89	796.9	1204.8	.60381	.8957	1.4995	430
440	381.2	.019260	1.2192	418.98	786.3	1205.3	.61605	.8740	1.4900	440
450	422.1	.019433	1.1011	430.2	775.4	1205.6	.6282	.8523	1.4806	450
460	466.3	0.019614	0.9961	441.4	764.1	1205.5	0.6404	0.8308	1.4712	460
470	514.1	.019803	.9025	452.8	752.4	1205.2	.6525	.8093	1.4618	470
480	565.5	.020002	.8187	464.3	740.3	1204.6	.6646	.7878	1.4524	480
490	620.7	.020211	.7436	475.9	727.8	1203.7	.6767	.7663	1.4430	490
500	680.0	.02043	.6761	487.7	714.8	1202.5	.6888	.7448	1.4335	500

Temperatures in this table follow the Thermodynamic Fahrenheit Scale.

ادامه دارد...

Abs. Press. Lb/Sq In. p	Fahr. Temp. (F)	Specific Volume		Enthalpy			Entropy			Abs. Press. Lb/Sq In. p
		Sat. Liquid $v_f$	Sat. Vapor $v_g$	Sat. Liquid $h_f$	Evap. $h_{fg}$	Sat. Vapor $h_g$	Sat. Liquid $s_f$	Evap. $s_{fg}$	Sat. Vapor $s_g$	
14.696	211.99	0.016715	26.80	180.15	970.4	1150.5	0.31212	1.4446	1.7567	14.696
16	216.31	0.016746	24.75	184.50	967.6	1152.1	0.31858	1.4313	1.7499	16
18	222.40	.016789	22.17	190.64	963.7	1154.4	.32762	1.4128	1.7404	18
20	227.96	.016830	20.09	196.26	960.1	1156.4	.33580	1.3962	1.7320	20
22	233.08	.016868	18.38	201.43	956.8	1158.2	.34329	1.3811	1.7244	22
24	237.82	.016905	16.94	206.23	953.7	1159.9	.35019	1.3672	1.7174	24
26	242.26	.016939	15.719	210.73	950.8	1161.5	.35660	1.3544	1.7110	26
28	246.42	.016972	14.665	214.95	948.0	1163.0	.36259	1.3425	1.7051	28
30	250.34	.017004	13.748	218.93	945.4	1164.3	.36821	1.3314	1.6996	30
32	254.06	0.017034	12.942	222.71	942.9	1165.6	0.37351	1.3210	1.6945	32
34	257.59	.017064	12.228	226.31	940.5	1166.8	.37852	1.3111	1.6896	34
36	260.96	.017092	11.591	229.73	938.2	1167.9	.38328	1.3018	1.6851	36
38	264.18	.017119	11.018	233.01	936.0	1169.0	.38782	1.2930	1.6808	38
40	267.26	.017146	10.501	236.16	933.8	1170.0	.39214	1.2845	1.6767	40
42	270.22	.017172	10.032	239.18	931.8	1171.0	.39628	1.2765	1.6728	42
44	273.07	.017197	9.603	242.09	929.8	1171.9	.40026	1.2688	1.6691	44
46	275.82	.017221	9.211	244.90	927.9	1172.8	.40407	1.2615	1.6656	46
48	278.47	.017245	8.851	247.61	926.0	1173.6	.40775	1.2544	1.6622	48
50	281.03	.017269	8.518	250.24	924.2	1174.4	.41129	1.2476	1.6589	50
52	283.52	0.017291	8.210	252.78	922.4	1175.2	0.41471	1.2411	1.6558	52
54	285.92	.017314	7.924	255.25	920.7	1176.0	.41802	1.2348	1.6528	54
56	288.26	.017336	7.658	257.65	919.0	1176.7	.42122	1.2287	1.6499	56
58	290.53	.017357	7.410	259.98	917.4	1177.4	.42432	1.2228	1.6471	58
60	292.73	.017378	7.177	262.25	915.8	1178.0	.42733	1.2170	1.6444	60
62	294.88	.017399	6.960	264.46	914.2	1178.7	.43026	1.2115	1.6418	62
64	296.98	.017419	6.755	266.61	912.7	1179.3	.43310	1.2061	1.6392	64
66	299.02	.017439	6.562	268.72	911.2	1179.9	.43587	1.2009	1.6368	66
68	301.01	.017458	6.380	270.77	909.7	1180.5	.43857	1.1958	1.6344	68
70	302.96	.017478	6.209	272.79	908.3	1181.0	.44120	1.1909	1.6321	70
72	304.86	0.017496	6.046	274.75	906.8	1181.6	0.44376	1.1860	1.6298	72
74	306.72	.017515	5.892	276.67	905.4	1182.1	.44626	1.1814	1.6276	74
76	308.54	.017534	5.746	278.55	904.1	1182.6	.44871	1.1768	1.6255	76
78	310.32	.017552	5.607	280.40	902.7	1183.1	.45110	1.1723	1.6234	78
80	312.07	.017570	5.474	282.21	901.4	1183.6	.45344	1.1679	1.6214	80
82	313.78	.017587	5.348	283.98	900.1	1184.1	.45572	1.1637	1.6194	82
84	315.46	.017605	5.228	285.72	898.8	1184.5	.45796	1.1595	1.6175	84
86	317.11	.017622	5.111	287.43	897.6	1185.0	.46016	1.1554	1.6156	86
88	318.72	.017639	5.004	289.11	896.3	1185.4	.46231	1.1514	1.6137	88
90	320.31	.017655	4.898	290.76	895.1	1185.9	.46442	1.1475	1.6119	90
92	321.87	0.017672	4.798	292.38	893.9	1186.3	0.46649	1.1436	1.6101	92
94	323.41	.017688	4.701	293.98	892.7	1186.7	.46852	1.1399	1.6084	94
96	324.91	.017705	4.609	295.55	891.5	1187.1	.47051	1.1362	1.6067	96
98	326.40	.017721	4.520	297.09	890.4	1187.4	.47247	1.1326	1.6050	98
100	327.86	.017736	4.434	298.61	889.2	1187.8	.47439	1.1290	1.6034	100
110	334.82	.017813	4.051	305.88	883.7	1189.6	.48355	1.1122	1.5957	110
120	341.30	.017886	3.730	312.67	878.5	1191.1	.49201	1.0966	1.5886	120
130	347.37	.017957	3.457	319.04	873.5	1192.5	.49989	1.0822	1.5821	130
140	353.08	.018024	3.221	325.05	868.7	1193.8	.50727	1.0688	1.5761	140
150	358.48	.018089	3.016	330.75	864.2	1194.9	.51422	1.0562	1.5704	150
160	363.60	0.018152	2.836	336.16	859.8	1196.0	0.52078	1.0443	1.5651	160
170	368.47	.018214	2.676	341.33	855.6	1196.9	.52700	1.0330	1.5600	170
180	373.13	.018273	2.533	346.29	851.5	1197.8	.53292	1.0223	1.5553	180
190	377.59	.018331	2.405	351.04	847.5	1198.6	.53857	1.0122	1.5507	190
200	381.86	.018387	2.289	355.6	843.7	1199.3	.5440	1.0025	1.5464	200
250	401.04	.018653	1.8448	376.2	825.8	1202.1	.5680	0.9594	1.5274	250
300	417.43	.018896	1.5442	394.1	809.8	1203.9	.5883	.9232	1.5115	300
350	431.82	.019124	1.3267	409.9	795.0	1204.9	.6060	.8917	1.4978	350
400	444.70	.019340	1.1620	424.2	781.2	1205.5	.6218	.8638	1.4856	400
450	456.39	.019547	1.0326	437.4	768.2	1205.6	.6360	.8385	1.4746	450
500	467.13	0.019748	0.9283	449.5	755.8	1205.3	0.6490	0.8154	1.4645	500
550	477.07	.019943	.8423	460.9	743.9	1204.8	.6611	.7941	1.4551	550
600	486.33	.02013	.7702	471.7	732.4	1204.1	.6723	.7742	1.4464	600
700	503.23	.02051	.6558	491.5	710.5	1202.0	.6927	.7378	1.4305	700

Temperatures in this table follow the Thermodynamic Fahrenheit Scale.



جدول ۲-۱: نقطه جوش آب در ارتفاعات و فشارهای مختلف

Boiling point, degrees Fahrenheit	Altitude above sea level, feet	Atmospheric pressure, pounds per square inch	Barometer reduced to 32°F., inches	Boiling point, degrees Fahrenheit	Altitude above sea level, feet	Atmospheric pressure, pounds per square inch	Barometer reduced to 32°F., inches
184	15,221	8.20	16.70	199	6,843	11.29	22.90
185	14,649	8.38	17.96	200	6,304	11.52	23.47
186	14,075	8.57	17.45	201	5,764	11.76	23.95
187	13,498	8.76	17.83	202	5,225	12.01	24.45
188	12,934	8.95	18.22	203	4,697	12.26	24.96
189	12,367	9.14	18.61	204	4,169	12.51	25.48
190	11,799	9.34	19.02	205	3,642	12.77	26.00
191	11,243	9.54	19.43	206	3,115	13.03	26.53
192	10,685	9.74	19.85	207	2,589	13.30	27.08
193	10,127	9.95	20.27	208	2,063	13.57	27.63
194	9,579	10.17	20.71	209	1,539	13.85	28.19
195	9,031	10.39	21.15	210	1,025	14.13	28.76
196	8,481	10.61	21.60	211	512	14.41	29.33
197	7,932	10.83	22.05	212	Sea level	14.70	29.92
198	7,381	11.06	22.52				

جدول ۳-۱: وزن مخصوص آب در دماهای مختلف بر حسب پاوند برفوت مکعب و پاوند بر گالن

Temperature, degrees Fahrenheit	Relative volume	Weight in pounds per cubic foot	Weight in pounds per gallon	Temperature, degrees Fahrenheit	Relative volume	Weight in pounds per cubic foot	Weight in pounds per gallon	Temperature, degrees Fahrenheit	Relative volume	Weight in pounds per cubic foot	Weight in pounds per gallon
32	1.00013	62.42	8.34	250	1.061	58.83	7.86	480	1.256	49.7	6.64
39	1.00000	62.428	8.345	260	1.066	58.55	7.83	490	1.269	49.2	6.58
40	1.00001	62.42	8.34	270	1.072	58.26	7.79	500	1.283	48.7	6.51
50	1.00027	62.42	8.34	280	1.077	57.96	7.75	510	1.297	48.1	6.43
60	1.00096	62.37	8.34	290	1.083	57.65	7.71	520	1.312	47.6	6.36
70	1.00201	62.30	8.33	300	1.089	57.33	7.66	530	1.329	47.0	6.28
80	1.00338	62.22	8.32	310	1.095	57.00	7.62	540	1.35	46.3	6.19
90	1.00504	62.11	8.30	320	1.102	56.66	7.57	550	1.37	45.6	6.10
100	1.00698	62.00	8.29	330	1.109	56.30	7.53	560	1.39	44.9	6.00
110	1.0092	61.86	8.27	340	1.116	55.94	7.48	570	1.42	44.1	5.90
120	1.0116	61.71	8.25	350	1.124	55.57	7.43	580	1.44	43.3	5.79
130	1.0142	61.55	8.23	360	1.131	55.18	7.38	590	1.46	42.6	5.69
140	1.0171	61.38	8.21	370	1.140	54.78	7.32	600	1.49	41.8	5.59
150	1.020	61.20	8.18	380	1.148	54.36	7.27	610	1.52	41.0	5.48
160	1.023	61.00	8.15	390	1.157	53.94	7.21	620	1.55	40.2	5.37
170	1.027	60.80	8.13	400	1.167	53.5	7.15	630	1.59	39.4	5.27
180	1.030	60.58	8.10	410	1.177	53.0	7.09	640	1.63	38.5	5.15
190	1.034	60.36	8.07	420	1.187	52.6	7.03	650	1.67	37.5	5.01
200	1.038	60.12	8.04	430	1.197	52.2	6.98	660	1.72	36.4	4.87
210	1.043	59.88	8.00	440	1.208	51.7	6.91	670	1.78	35.2	4.71
212	1.044	59.83	8.00	450	1.220	51.2	6.84	680	1.86	33.8	4.52
220	1.047	59.63	7.97	460	1.222	50.7	6.78	690	1.95	32.1	4.29
230	1.052	59.37	7.94	470	1.244	50.2	6.71	706.1	3.11	20.1	2.69
240	1.056	59.11	7.90								

جدول ۴-۱: تصحیح نمودار مشخصه هوا برای ارتفاعات مختلف

ADDITIVE CORRECTIONS FOR W. B. AND v WHEN BAROMETRIC PRESSURE DIFFERS FROM STANDARD BAROMETER



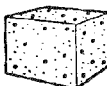

Wet Bulb Temp. 'f	Sat. Vapor Press. In. Hg	APPROXIMATE ALTITUDE IN FEET															
		-900		900		1800		2700		3700		4800		5900			
		$\Delta p = +1$		$\Delta p = -1$		$\Delta p = -2$		$\Delta p = -3$		$\Delta p = -4$		$\Delta p = -5$		$\Delta p = -6$			
		$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$	$\Delta W_s'$	$\Delta h$		
20	.1027	-0.5	-0.08	0.5	0.08	1.1	0.17	1.7	0.26	2.3	0.36	3.0	0.46	3.8	0.58		
21	.1078	-0.5	-0.08	0.5	0.08	1.1	0.17	1.8	0.27	2.4	0.37	3.2	0.49	4.0	0.61		
22	.1130	-0.5	-0.08	0.6	0.09	1.2	0.18	1.9	0.29	2.5	0.40	3.4	0.52	4.2	0.64		
23	.1186	-0.6	-0.09	0.6	0.09	1.3	0.19	2.0	0.30	2.7	0.41	3.6	0.55	4.4	0.67		
24	.1243	-0.6	-0.09	0.6	0.10	1.3	0.20	2.1	0.32	2.8	0.43	3.7	0.57	4.6	0.71		
25	.1303	-0.6	-0.10	0.7	0.10	1.4	0.21	2.2	0.33	3.0	0.46	3.9	0.60	4.9	0.75		
26	.1366	-0.7	-0.10	0.7	0.11	1.4	0.22	2.3	0.35	3.1	0.48	4.1	0.63	5.1	0.78		
27	.1431	-0.7	-0.11	0.7	0.11	1.5	0.23	2.4	0.37	3.2	0.50	4.3	0.66	5.4	0.83		
28	.1500	-0.7	-0.11	0.8	0.12	1.6	0.24	2.5	0.38	3.4	0.52	4.5	0.69	5.6	0.86		
29	.1571	-0.8	-0.12	0.8	0.12	1.7	0.26	2.6	0.40	3.6	0.55	4.7	0.72	5.8	0.89		
30	.1645	-0.8	-0.12	0.8	0.13	1.7	0.27	2.7	0.42	3.8	0.58	4.9	0.75	6.1	0.92		
31	.1723	-0.8	-0.13	0.9	0.13	1.8	0.28	2.8	0.44	3.9	0.60	5.1	0.78	6.3	0.95		
32	.1803	-0.9	-0.13	0.9	0.14	1.9	0.29	3.0	0.45	4.1	0.63	5.3	0.82	6.6	1.01		
33	.1878	-0.9	-0.14	1.0	0.15	2.0	0.30	3.1	0.47	4.3	0.66	5.5	0.85	6.9	1.06		
34	.1955	-0.9	-0.14	1.0	0.15	2.1	0.32	3.2	0.49	4.4	0.68	5.7	0.88	7.2	1.11		
35	.2034	-1.0	-0.15	1.0	0.16	2.1	0.33	3.4	0.51	4.6	0.71	6.0	0.92	7.5	1.16		
36	.2117	-1.0	-0.15	1.1	0.17	2.2	0.35	3.5	0.53	4.8	0.74	6.2	0.96	7.8	1.20		
37	.2202	-1.0	-0.16	1.1	0.17	2.3	0.36	3.6	0.56	5.0	0.77	6.5	1.00	8.1	1.25		
38	.2290	-1.1	-0.17	1.2	0.18	2.4	0.37	3.8	0.58	5.2	0.80	6.8	1.05	8.4	1.30		
39	.2382	-1.1	-0.18	1.2	0.19	2.5	0.39	3.9	0.61	5.5	0.85	7.1	1.09	8.8	1.36		
40	.2477	-1.2	-0.18	1.3	0.20	2.6	0.41	4.1	0.63	5.7	0.88	7.4	1.14	9.2	1.42		
41	.2575	-1.2	-0.19	1.3	0.20	2.7	0.42	4.3	0.66	6.0	0.91	7.7	1.19	9.6	1.48		
42	.2676	-1.3	-0.20	1.4	0.21	2.8	0.44	4.4	0.69	6.1	0.94	8.0	1.23	10.0	1.54		
43	.2781	-1.3	-0.21	1.4	0.22	3.0	0.45	4.6	0.71	6.4	0.99	8.4	1.29	10.4	1.61		
44	.2890	-1.4	-0.22	1.5	0.23	3.1	0.47	4.8	0.74	6.7	1.04	8.7	1.34	10.8	1.67		
45	.3002	-1.4	-0.22	1.6	0.24	3.2	0.49	5.0	0.77	6.9	1.07	9.1	1.40	11.2	1.75		
46	.3119	-1.5	-0.23	1.6	0.25	3.3	0.51	5.2	0.80	7.2	1.11	9.4	1.45	11.7	1.81		
47	.3239	-1.6	-0.24	1.7	0.26	3.4	0.53	5.4	0.84	7.5	1.16	9.8	1.52	12.1	1.87		
48	.3363	-1.6	-0.25	1.8	0.27	3.6	0.56	5.6	0.87	7.8	1.21	10.2	1.58	12.6	1.95		
49	.3491	-1.7	-0.26	1.8	0.28	3.7	0.58	5.8	0.90	8.1	1.25	10.5	1.63	13.1	2.02		
50	.3624	-1.7	-0.27	1.9	0.29	3.9	0.60	6.1	0.94	8.4	1.30	10.9	1.69	13.6	2.11		
51	.3761	-1.8	-0.28	2.0	0.30	4.0	0.63	6.3	0.97	8.7	1.35	11.3	1.75	14.1	2.18		
52	.3903	-1.9	-0.29	2.0	0.32	4.2	0.65	6.5	1.01	9.0	1.40	11.8	1.83	14.7	2.26		
53	.4049	-1.9	-0.30	2.1	0.33	4.4	0.68	6.7	1.05	9.3	1.44	12.2	1.89	15.2	2.36		
54	.4200	-2.0	-0.31	2.2	0.34	4.5	0.70	7.0	1.09	9.7	1.50	12.7	1.97	15.8	2.45		
55	.4356	-2.1	-0.32	2.3	0.35	4.7	0.73	7.3	1.13	10.1	1.57	13.2	2.05	16.4	2.54		
56	.4518	-2.2	-0.34	2.4	0.37	4.9	0.76	7.6	1.18	10.5	1.63	13.7	2.13	17.1	2.66		
57	.4684	-2.3	-0.35	2.4	0.37	5.1	0.79	7.9	1.22	10.9	1.69	14.2	2.21	17.7	2.75		
58	.4856	-2.3	-0.37	2.5	0.39	5.3	0.82	8.2	1.27	11.3	1.76	14.7	2.28	18.4	2.86		
59	.5033	-2.4	-0.38	2.6	0.41	5.4	0.85	8.5	1.32	11.7	1.82	15.3	2.36	19.1	2.97		
60	.5216	-2.5	-0.40	2.7	0.42	5.7	0.88	8.8	1.37	12.2	1.90	15.9	2.47	19.9	3.09		
61	.5405	-2.6	-0.41	2.8	0.44	5.9	0.91	9.2	1.43	12.7	1.98	16.5	2.57	20.7	3.23		
62	.5599	-2.7	-0.43	2.9	0.46	6.1	0.95	9.5	1.48	13.2	2.05	17.1	2.66	21.4	3.33		
63	.5800	-2.8	-0.44	3.0	0.48	6.3	0.98	9.9	1.54	13.7	2.13	17.7	2.76	22.3	3.47		
64	.6007	-2.9	-0.46	3.2	0.49	6.5	1.02	10.2	1.59	14.2	2.21	18.4	2.87	23.1	3.60		
65	.6221	-3.1	-0.48	3.3	0.51	6.8	1.06	10.6	1.65	14.7	2.29	19.1	2.98	23.9	3.73		
66	.6441	-3.2	-0.50	3.4	0.53	7.1	1.10	11.0	1.72	15.3	2.38	19.8	3.09	24.8	3.87		
67	.6668	-3.3	-0.51	3.5	0.55	7.3	1.14	11.4	1.78	15.8	2.47	20.5	3.20	25.7	4.01		
68	.6902	-3.4	-0.53	3.7	0.57	7.6	1.18	11.8	1.84	16.4	2.56	21.3	3.32	26.7	4.16		
69	.7143	-3.5	-0.55	3.8	0.59	7.9	1.23	12.2	1.90	17.0	2.65	22.1	3.45	27.7	4.32		
70	.7392	-3.7	-0.57	3.9	0.61	8.1	1.27	12.7	1.98	17.6	2.75	22.9	3.58	28.7	4.48		
71	.7648	-3.8	-0.59	4.1	0.64	8.4	1.32	13.1	2.05	18.2	2.84	23.7	3.70	29.7	4.64		
72	.7911	-3.9	-0.61	4.2	0.66	8.7	1.36	13.6	2.13	18.8	2.94	24.6	3.84	30.8	4.82		
73	.8183	-4.1	-0.63	4.4	0.69	9.0	1.41	14.1	2.20	19.5	3.03	25.5	3.99	31.9	4.99		
74	.8463	-4.2	-0.66	4.6	0.71	9.4	1.46	14.6	2.28	20.2	3.16	26.4	4.14	33.1	5.18		
75	.8750	-4.4	-0.68	4.7	0.74	9.7	1.52	15.1	2.36	20.9	3.27	27.4	4.28	34.3	5.37		
76	.9047	-4.5	-0.71	4.9	0.77	10.0	1.57	15.7	2.46	21.7	3.39	28.3	4.42	35.5	5.56		
77	.9352	-4.7	-0.73	5.1	0.79	10.4	1.63	16.3	2.55	22.5	3.52	29.4	4.61	36.9	5.77		
78	.9667	-4.9	-0.76	5.2	0.82	10.8	1.69	16.9	2.65	23.3	3.65	30.5	4.77	38.2	5.98		
79	.9990	-5.0	-0.79	5.4	0.85	11.2	1.75	17.5	2.74	24.2	3.79	31.6	4.95	39.6	6.20		
80	1.032	-5.2	-0.82	5.6	0.89	11.6	1.82	18.1	2.84	25.1	3.93	32.7	5.13	41.0	6.43		
81	1.067	-5.4	-0.85	5.8	0.91	12.0	1.88	18.8	2.95	26.0	4.08	33.9	5.32	42.5	6.66		
82	1.102	-5.6	-0.88	6.0	0.94	12.5	1.96	19.5	3.06	27.0	4.24	35.1	5.51	44.0	6.90		
83	1.138	-5.8	-0.91	6.2	0.97	12.9	2.02	20.2	3.17	28.0	4.39	36.4	5.71	45.6	7.15		
84	1.175	-6.0	-0.94	6.4	1.00	13.3	2.10	20.9	3.28	28.9	4.54	37.7	5.92	47.2	7.41		

جدول ۵-۱: ضریب کلی هدایت حرارت (U) برای دیوارهای بتایی

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاء واحد سطح دیوار  $(\frac{lb}{ft^2})$

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of wall and finishes.

EXTERIOR FINISH	THICK-NESS (inches) and WEIGHT (lb per sq ft)	INTERIOR FINISH										
		None	3/4" Gypsum Board (Plaster Board) (2)	1/2" Plaster on Wall		Metal Lath Plastered on Furring		3/4" Gypsum or Wood Lath Plastered on Furring		Insulating Board Plain or Plastered on Furring		
				Sand Agg (6)	Lt Wt Agg (3)	3/4" Sand Plaster (7)	3/4" Lt Wt Plaster (3)	3/4" Sand Plaster (7)	1/2" Lt Wt Plaster (2)	1/2" Board (2)	1" Board (4)	
<b>SOLID BRICK</b> 	Face & Common	8 (87)	.48	.41	.45	.41	.21	.28	.29	.27	.22	.16
		12 (123)	.35	.31	.33	.30	.25	.23	.23	.22	.19	.14
		16 (173)	.27	.25	.26	.25	.21	.19	.20	.19	.16	.13
	Common Only	8 (80)	.41	.36	.39	.35	.28	.26	.26	.25	.21	.15
		12 (120)	.31	.28	.30	.27	.23	.22	.22	.21	.18	.14
		16 (160)	.25	.23	.24	.23	.19	.18	.18	.18	.16	.12
<b>STONE</b> 	8 (100)	.67	.55	.63	.53	.39	.34	.35	.32	.26	.18	
	12 (150)	.55	.47	.52	.46	.34	.31	.31	.29	.24	.17	
	16 (200)	.47	.41	.45	.40	.31	.28	.28	.27	.22	.16	
	24 (300)	.36	.32	.35	.32	.26	.24	.24	.23	.19	.15	
<b>ADOBÉ-BLOCKS OR BRICK</b>	8 (26)	.34	.30	.32	.30	.25	.23	.23	.22	.18	.12	
	12 (40)	.25	.23	.24	.23	.20	.18	.18	.18	.15	.14	
<b>POURED CONCRETE</b> 	140 lb/cu ft	6 (70)	.73	.55	.69	.58	.41	.36	.37	.34	.27	.18
		8 (93)	.67	.49	.63	.53	.39	.34	.35	.32	.26	.17
		10 (117)	.61	.44	.57	.49	.36	.32	.33	.31	.25	.17
		12 (140)	.55	.40	.52	.45	.34	.31	.31	.29	.24	.16
	80 lb/cu ft	6 (40)	.31	.28	.30	.27	.23	.21	.22	.21	.18	.14
		8 (53)	.25	.23	.24	.23	.19	.18	.18	.18	.16	.12
		10 (66)	.21	.19	.20	.19	.17	.16	.15	.14	.14	.11
		12 (80)	.18	.17	.17	.15	.15	.14	.14	.14	.12	.10
	30 lb/cu ft	6 (15)	.13	.13	.13	.13	.12	.11	.11	.11	.13	.09
		8 (20)	.10	.10	.10	.10	.09	.09	.09	.09	.10	.07
		10 (25)	.08	.08	.08	.08	.08	.07	.08	.07	.08	.06
		12 (30)	.07	.07	.07	.07	.07	.07	.06	.06	.07	.06
<b>HOLLOW CONCRETE BLOCKS</b> 	Sand & Gravel Agg	8 (43)	.52	.44	.48	.43	.33	.29	.30	.28	.23	.17
		12 (63)	.47	.41	.45	.40	.31	.28	.28	.27	.22	.16
	Cinder Agg	8 (37)	.39	.35	.37	.34	.27	.25	.25	.24	.20	.15
		12 (53)	.36	.33	.35	.32	.26	.24	.23	.23	.19	.15
	Lt Wt Agg	8 (32)	.33	.32	.34	.31	.26	.23	.24	.22	.19	.15
		12 (43)	.32	.29	.31	.28	.24	.22	.22	.21	.18	.14
<b>STUCCO ON HOLLOW CLAY TILE</b>	8 (39)	.36	.32	.34	.32	.26	.24	.24	.23	.19	.15	
	10 (44)	.32	.29	.31	.28	.23	.22	.22	.21	.18	.14	
	12 (49)	.29	.27	.28	.26	.22	.20	.21	.20	.17	.13	

1958 ASHAE Guide

Equations: Heat Gain, Btu/hr = (Area, sq ft) × (U value) × (Equivalent Temp diff, Table 19)

Heat Loss, Btu/hr = (Area, sq ft) × (U value) × (outdoor temp - inside temp)


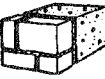
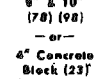
\*For addition of insulation and air spaces to above walls, refer to Table 31, page 75.

جدول ۶-۱: ضریب کلی هدایت حرارت (U) برای دیوارهای بتایی

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاا واحد سطح دیوار ( $\frac{lb}{ft^2}$ )

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of wall and finishes.

EXTERIOR FINISH	BACKING	THICK-NESS (inches) and WEIGHT (lb per sq ft)	INTERIOR FINISH									
			None	Gypsum Board (Plaster Board) (2)	3/4" Plaster on Wall		Metal Lath Plastered on Furring		3/4" Gypsum or Wood Lath Plastered on Furring		Insulating Board Plaster or Plastered on Furring	
					Sand Agg (6)	Lt Wt Agg (3)	3/4" Sand Plaster(7)	3/4" Lt Wt Plaster(3)	3/4" Sand Plaster(7)	3/4" Lt Wt Plaster(2)	3/4" Board (2)	1" Board (4)
 4" Face Brick (43) — or — 4" Stone (50) — or — Precast Concrete (Sand Agg) 4" & 6" (39) (58)	Concrete Block (Cinder Agg)	4 (20)	.41	.37	.39	.35	.28	.26	.26	.25	.21	.16
		8 (37)	.33	.30	.32	.29	.24	.22	.23	.21	.18	.14
		12 (53)	.31	.29	.30	.28	.23	.21	.22	.21	.18	.14
	(Lt Wt Agg)	4 (17)	.35	.32	.34	.31	.25	.23	.24	.22	.19	.15
		8 (32)	.30	.28	.29	.27	.23	.21	.21	.20	.17	.14
		12 (43)	.28	.26	.27	.25	.21	.20	.20	.19	.17	.13
	(Sand & Gravel Agg)	4 (23)	.49	.44	.46	.41	.32	.29	.29	.27	.22	.17
		8 (43)	.41	.37	.39	.35	.28	.26	.26	.25	.21	.16
		12 (63)	.38	.35	.37	.33	.27	.25	.25	.24	.20	.15
	Hollow Clay Tile	4 (16)	.41	.37	.39	.35	.28	.26	.26	.25	.21	.16
		8 (30)	.31	.29	.30	.28	.23	.22	.22	.21	.18	.14
		12 (40)	.26	.25	.25	.24	.20	.19	.19	.18	.16	.13
 6" Common Brick (40) — or — Precast Concrete (Sand Agg) 6" & 10" (78) (98) — or — 6" Concrete Block (23) (Sand Agg) — or — 6" Stone (100)	Concrete Block (Cinder Agg)	4 (20)	.36	.33	.35	.32	.26	.24	.24	.23	.19	.15
		8 (37)	.29	.28*	.29	.26	.22	.21	.21	.20	.17	.14
		12 (53)	.28	.26	.27	.25	.21	.20	.20	.19	.17	.13
	(Lt Wt Agg)	4 (17)	.32	.29	.30	.28	.23	.22	.22	.21	.18	.14
		8 (32)	.27	.26	.26	.25	.21	.20	.20	.19	.17	.13
		12 (43)	.25	.24	.25	.23	.20	.19	.19	.18	.16	.13
	(Sand & Gravel Agg)	4 (23)	.42	.38	.40	.36	.29	.26	.27	.25	.21	.16
		8 (43)	.36	.33	.35	.32	.26	.24	.24	.23	.19	.15
		12 (63)	.34	.32	.33	.30	.25	.23	.23	.22	.19	.15
	Hollow Clay Tile	4 (16)	.36	.33	.35	.32	.26	.24	.24	.23	.19	.15
		8 (30)	.28	.27	.28	.26	.22	.20	.20	.19	.17	.13
		12 (40)	.24	.23	.23	.22	.19	.18	.18	.17	.15	.12
 6" Concrete Block (23) (Sand Agg) — or — 6" Stone (100)	Concrete (Lt Wt Agg) 80 lb/cu ft	4 (26)	.32	.29	.30	.28	.23	.22	.22	.21	.18	.14
		6 (40)	.25	.23	.25	.23	.20	.18	.19	.18	.15	.13
		8 (54)	.21	.20	.20	.19	.17	.16	.16	.16	.14	.11
	(Sand & Gravel Agg)	4 (47)	.50	.45	.48	.42	.32	.29	.30	.28	.23	.17
		6 (70)	.47	.42	.44	.39	.31	.28	.29	.27	.22	.17
		8 (95)	.43	.40	.41	.37	.29	.27	.28	.26	.21	.16
	Common Brick	4 (40)	.42	.37	.40	.36	.29	.26	.27	.26	.21	.16
		8 (80)	.32	.29	.30	.28	.23	.22	.22	.21	.18	.14

Equation: Heat Gain, Btu/hr = (Area, sq ft) × (U value) × (equivalent temp diff, Table 19)

Heat Loss, Btu/hr = (Area, sq ft) × (U value) × (outdoor temp - inside temp)

\*For addition of insulation and air spaces to walls, refer to Table 31, page 73.

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جدول ۷-۱: ضریب کلی هدایت حرارت (U) برای دیوارهای صنعتی سبک

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاغ واحد سطح دیوار  $(\frac{lb}{ft^2})$

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of wall and finishes.

EXTERIOR FINISH	SHEATHING	WEIGHT (lb per sq ft)	INTERIOR FINISH				
			None	Flat Iron (1)	Insulating Board		Wood
					$\frac{1}{2}$ " (2)	$\frac{3}{4}$ " (2)	
$\frac{1}{4}$ " Corrugated Trenite	None $\frac{1}{4}$ " Ins. Board $\frac{3}{4}$ " Ins. Board	(1) (2) (2)	1.16 .34 .27	.55 .26 .21	.32 .19 .17	.26 .17 .15	.36 .21 .18
24 Gauge Corrugated Iron	None $\frac{1}{4}$ " Ins. Board $\frac{3}{4}$ " Ins. Board $\frac{3}{4}$ " Wood	(1) (2) (2) (3)	1.40 .36 .28 .46	.60 .27 .22 .33	.33 .20 .17 .22	.27 .17 .15 .19	.38 .21 .18 .24
$\frac{3}{4}$ " Wood Siding	None	(2)	.58	.37	.25	.21	.27

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Equations: Heat Gain, Btu/hr = (Area, sq ft) × (U value) × (equivalent temp diff, Table 19).

Heat Loss, Btu/hr = (Area, sq ft) × (U value) × (outdoor temp - inside temp).

\*For addition of air spaces and insulation to walls, refer to Table 31, page 73.

†Values apply when sealed with caulking compound between sheets, and at ground and roof lines. When sheets are not sealed, increase U factors by 10%. These values may be used for roofs, heat flow up-winter, for heat flow down-summer, multiply above factors by 0.8.

جدول ۸-۱: ضریب کلی هدایت حرارت (U) برای دیوارهای پیش ساخته سبک

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاغ واحد سطح دیوار  $(\frac{lb}{ft^2})$

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of wall and finishes.

INSULATING CORE MATERIAL	DENSITY † (lb/cu ft)	METAL FACING (2)				METAL FACING WITH $\frac{1}{4}$ " AIR SPACE (3)			
		Core Thickness (in.)				Core Thickness (in.)			
		1	2	3	4	1	2	3	4
Glass, Wood, Cotton Fibers	3	.21	.12	.08	.06	.19	.11	.08	.06
Paper Honeycomb	5	.39	.23	.17	.13	.32	.20	.15	.12
Paper Honeycomb with Perlite Fill, Foamglas	9	.29	.17	.12	.09	.25	.15	.11	.09
Fiberboard	15	.36	.21	.15	.12	.29	.19	.14	.11
Wood Shredded (Cemented in Preformed Slabs)	22	.31	.18	.13	.10	.25	.16	.12	.09
Expanded Vermiculite	7	.34	.20	.14	.11	.28	.18	.13	.10
Vermiculite	20	.44	.27	.19	.15	.35	.23	.18	.14
or Perlite	30	.51	.32	.24	.19	.39	.27	.21	.17
Concrete	40	.58	.38	.29	.23	.43	.31	.25	.20
	60	.69	.49	.38	.31	.49	.36	.31	.26

Equations: Heat Gain, Btu/hr = (Area, sq ft) × (U value) × (equivalent temp diff, Table 19).

Heat Loss, Btu/hr = (Area, sq ft) × (U value) × (outdoor temp - inside temp).

\*For addition of insulation and air spaces to walls, refer to Table 31, page 73.

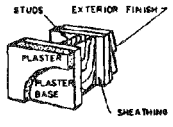
†Total weight per sq ft =  $\frac{\text{core density} \times \text{core thickness}}{12} + 3 \text{ lb/sq ft}$

جدول ۹-۱: ضریب کلی هدایت حرارت (U) برای پارتیشن‌ها

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بنا از واحد سطح دیوار  $(\frac{lb}{ft^2})$

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of component materials.

		INTERIOR FINISH									
		None	$\frac{3}{4}$ " Wood Panel (2)	$\frac{3}{8}$ " Gypsum Board (Plaster Board) (2)	Metal Lath Plastered		$\frac{3}{8}$ " Gypsum or Wood Lath Plastered		Insulating Board Plain or Plastered		
					$\frac{3}{4}$ " Sand Plaster (2)	$\frac{3}{4}$ " Lt Wt Plaster (3)	$\frac{1}{2}$ " Sand Plaster (7)	$\frac{1}{2}$ " Lt Wt Plaster (2)	$\frac{1}{2}$ " Board (2)	1" Board (4)	
EXTERIOR FINISH	SHEATHING										
1" Stucco (10)	None, Building Paper	.91	.33	.42	.45	.39	.40	.37	.29	.20	
OR Asbestos Cement Siding (1)	$\frac{3}{4}$ " Plywood (1) or $\frac{1}{2}$ " Gyp (2)	.68	.30	.37	.40	.35	.36	.33	.26	.19	
OR Asphalt Roll Siding (2)	$\frac{3}{8}$ " Wood & Bldg Paper (2)	.48	.25	.30	.31	.28	.29	.27	.22	.17	
	$\frac{1}{2}$ " Insulating Board (2)	.42	.23	.27	.29	.26	.27	.25	.21	.16	
	$\frac{3}{8}$ " Insulating Board (3)	.32	.20	.23	.24	.22	.22	.21	.18	.14	
4" Face Brick Veneer (43) OR $\frac{3}{8}$ " Plywood (1)	None, Building Paper	.73	.30	.37	.40	.35	.36	.33	.26	.19	
OR Asphalt Siding (2)	$\frac{3}{4}$ " Plywood (1) or $\frac{1}{2}$ " Gyp (2)	.57	.28	.33	.36	.32	.32	.30	.24	.18	
	$\frac{3}{8}$ " Wood & Bldg Paper (2)	.42	.23	.27	.29	.26	.27	.25	.21	.16	
	$\frac{1}{2}$ " Insulating Board (2)	.38	.22	.25	.27	.25	.25	.24	.20	.15	
	$\frac{3}{8}$ " Insulating Board (3)	.30	.19	.21	.22	.21	.21	.20	.17	.14	
Wood Siding (3) OR Wood Shingles (2) OR $\frac{3}{4}$ " Wood Panels (3)	None, Building Paper	.57	.27	.33	.35	.31	.32	.30	.24	.18	
	$\frac{3}{4}$ " Plywood (1) or $\frac{1}{2}$ " Gyp (2)	.48	.25	.30	.31	.28	.29	.27	.22	.17	
	$\frac{3}{8}$ " Wood & Bldg Paper (2)	.36	.22	.25	.26	.24	.24	.23	.19	.15	
	$\frac{1}{2}$ " Insulating Board (2)	.33	.20	.23	.24	.22	.23	.22	.18	.14	
	$\frac{3}{8}$ " Insulating Board (3)	.27	.18	.20	.21	.19	.19	.19	.16	.13	
Wood Shingles Over $\frac{3}{8}$ " Insul Beaker Board (3) OR Asphalt Insulated Siding (4)	None, Building Paper	.43	.24	.28	.29	.27	.27	.25	.21	.16	
	$\frac{3}{8}$ " Plywood (1) or $\frac{1}{2}$ " Gyp (2)	.38	.22	.25	.27	.24	.25	.23	.19	.15	
	$\frac{3}{8}$ " Wood & Bldg Paper (2)	.30	.19	.22	.23	.21	.21	.20	.17	.14	
	$\frac{1}{2}$ " Insulating Board (2)	.28	.18	.20	.21	.20	.20	.19	.16	.13	
	$\frac{3}{8}$ " Insulating Board (3)	.23	.16	.18	.18	.17	.18	.17	.15	.12	
Single Partition (Finish on one side only)		.43	.60	.67	.67	.55	.57	.50	.36	.23	
Double Partition (Finish on both sides)		.24	.34	.39	.39	.31	.32	.28	.19	.12	

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Equation:  $Wc/lh = \text{Heat Gain, Btu/hr} = (\text{Area, sq ft}) \times (U \text{ value}) \times (\text{equivalent temp diff, Table 19}).$

$-\text{Heat Loss, Btu/hr} = (\text{Area, sq ft}) \times (U \text{ value}) \times (\text{outdoor temp} - \text{inside temp}).$

Partitions, unconditioned space adjacent—Heat Gain or Loss, Btu/hr = (Area sq ft)  $\times$  (U value)  $\times$  (outdoor temp—inside temp—5 F).

Partitions, kitchen or boiler room adjacent—Heat Gain, Btu/hr = (Area sq ft)  $\times$  (U value)

$\times$  (actual temp diff or outdoor temp—inside temp + 15 F to 25 F).


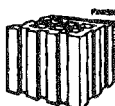

\*For addition of insulation and air spaces to partitions, refer to Table 31, page 75.

جدول ۱۰-۱: ضریب کلی هدایت حرارت (U) برای دیوارهای داخلی بتایی

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاء واحد سطح دیوار ( $\frac{lb}{ft^2}$ )

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of masonry unit and finish  $\times 1$  or  $2$  (finished one or both sides).

BACKING	THICK- NESS (inches) and WEIGHT (per sq ft)	Both Sides Un- Finished	No. of Sides Finished	FINISH								
				$\frac{3}{4}$ " Gypsum Board (Plaster Board) (2)	$\frac{1}{2}$ " Plaster on Wall		Metal Lath- Plastered on Furring		$\frac{1}{2}$ " Gypsum or Wood Lath Plastered on Furring		Insulating Board Plain or Plastered on Furring	
					Sand Agg (6)	Lt Wt Agg (3)	$\frac{1}{2}$ " Sand Plaster (7)	$\frac{1}{2}$ " Lt Wt Plaster (3)	$\frac{1}{2}$ " Sand Plaster (7)	$\frac{1}{2}$ " Lt Wt Plaster (2)	$\frac{1}{2}$ " Board (2)	1" Board (4)
<b>HOLLOW CONCRETE BLOCK</b>  Cinder Agg	3 (17)	.45	One Both	.39 .35	.43 .41	.38 .33	.30 .23	.27 .20	.28 .20	.26 .18	.21 .14	.16 .10
	4 (20)	.40	One Both	.36 .32	.39 .37	.35 .31	.28 .21	.26 .19	.26 .19	.25 .18	.20 .13	.15 .11
	8 (37)	.32	One Both	.29 .27	.31 .30	.29 .26	.24 .19	.22 .17	.22 .17	.21 .16	.18 .12	.14 .09
	12 (53)	.31	One Both	.28 .26	.30 .29	.27 .25	.23 .18	.21 .16	.22 .17	.21 .15	.17 .12	.14 .09
<b>1/2 Wt Agg</b>	3 (15)	.38	One Both	.34 .31	.36 .35	.33 .30	.27 .21	.25 .18	.25 .19	.24 .17	.20 .13	.15 .09
	4 (17)	.35	One Both	.31 .29	.34 .32	.31 .27	.25 .20	.23 .17	.24 .17	.22 .16	.19 .13	.13 .09
	8 (32)	.30	One Both	.27 .25	.29 .28	.27 .24	.22 .18	.21 .16	.21 .16	.20 .15	.17 .12	.14 .09
	12 (43)	.28	One Both	.25 .23	.27 .26	.25 .23	.21 .17	.20 .15	.20 .16	.19 .15	.16 .12	.13 .08
<b>Sand &amp; Gravel Agg</b>	8 (43)	.40	One Both	.36 .32	.39 .37	.35 .31	.28 .21	.26 .19	.26 .19	.25 .18	.20 .13	.15 .11
	12 (63)	.38	One Both	.34 .30	.36 .35	.33 .29	.27 .21	.25 .18	.25 .19	.24 .17	.19 .13	.15 .09
<b>HOLLOW CLAY TILE</b> 	3 (15)	.46	One Both	.40 .36	.44 .42	.39 .34	.31 .23	.28 .20	.28 .20	.27 .19	.22 .14	.16 .10
	4 (16)	.40	One Both	.36 .32	.39 .37	.35 .31	.28 .21	.26 .19	.26 .19	.25 .18	.20 .13	.15 .11
	6 (25)	.35	One Both	.31 .28	.33 .32	.31 .27	.25 .20	.23 .17	.23 .18	.22 .16	.19 .13	.13 .09
	8 (30)	.31	One Both	.28 .26	.30 .29	.28 .25	.23 .18	.22 .16	.22 .17	.21 .16	.18 .12	.14 .09
<b>HOLLOW GYPSUM TILE</b>	3 (9)	.37	One Both	.33 .30	.35 .34	.32 .29	.26 .20	.24 .18	.24 .18	.23 .15	.19 .13	.15 .09
	4 (13)	.33	One Both	.30 .27	.32 .31	.29 .26	.24 .19	.22 .17	.23 .17	.22 .16	.18 .12	.14 .09
<b>SOLID GYPSUM PLASTER</b> 	1 1/2						.61 (13)	.43 (6)				
	2						.58 (18)	.38 (8)				
	2 1/2						.55 (22)	.34 (9)				

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Equation: Partitions, unconditioned space adjacent: Heat Gain or Loss, Btu/hr = (Area, sq ft)  $\times$  (U value)  $\times$  (outdoor temp—inside temp—5 F).

Partitions, kitchen or boiler room adjacent: Heat Gain or Loss, Btu/hr = (Area, sq ft)  $\times$  (U value)

$\times$  (actual temp diff or outdoor temp—inside temp + 15 F & 25 F).



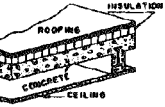
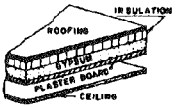
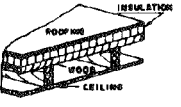
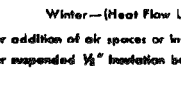

\*For addition of insulation and air spaces to partitions, refer to Table 31, page 75.

جدول ۱۱-۱: ضریب کلی هدایت حرارت (U) برای سقف طبقه آخر (زیربام)

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازا و واحد سطح سقف ( $\frac{lb}{ft^2}$ )

Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of roof, finish and insulation.

TYPE OF DECK	THICK-NESS OF DECK (Inches) and WEIGHT (lb per sq ft)	CEILING †	INSULATION ON TOP OF DECK INCHES						
			No Insulation	1/2 (1)	1 (1)	1 1/2 (2)	2 (3)	2 1/2 (3)	3 (4)
 Flat Metal	1 (5)	None or Plaster (6)	.67	.35	.23	.18	.15	.12	.10
		Suspended Plaster (5) Suspended Acou Tile (2)	.32 .23	.22 .18	.17 .14	.14 .12	.12 .11	.10 .09	.09 .08
 Preformed Slab—Wood Fiber and Cement Binder	2 (4)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.20 .19 .13	.16 .12 .10	.13 .11 .09	.11 .09 .08	.10 .08 .08	.09 .08 .07 .06	
	3 (7)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.14 .12 .10	.11 .10 .09	.10 .09 .08	.09 .07 .07	.08 .07 .07	.08 .06 .05	
 Concrete (Sand & Gravel Agg)	4, 6, 8 (47), (76), (93)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.51 .28 .21	.30 .20 .16	.21 .16 .13	.16 .13 .11	.14 .12 .10	.12 .10 .09 .08	
	(Lt Wt Agg on Gypsum Board)	2 (9)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.27 .18 .15	.20 .14 .12	.15 .12 .11	.13 .10 .09	.11 .09 .08	.10 .09 .08 .07
 Gypsum Slab on 1/2" Gypsum Board	3 (13)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.21 .15 .13	.16 .12 .11	.13 .11 .10	.11 .09 .08	.10 .08 .07	.09 .08 .07 .06	
	4 (16)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.17 .13 .12	.14 .11 .10	.11 .10 .09	.10 .08 .07	.09 .08 .07	.08 .07 .06 .05	
 Wood	2 (11)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.32 .21 .17	.22 .17 .13	.17 .13 .12	.14 .11 .10	.12 .10 .09	.10 .09 .08 .07	
	3 (15)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.27 .19 .15	.19 .15 .12	.15 .13 .11	.13 .11 .09	.11 .10 .08	.10 .09 .08 .07	
 Wood	4 (19)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.23 .17 .14	.17 .13 .12	.14 .12 .11	.12 .10 .09	.10 .09 .08	.09 .08 .07 .07	
	1 (3)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.40 .24 .19	.26 .18 .15	.19 .14 .13	.15 .12 .11	.13 .11 .10	.11 .09 .08 .07	
 Wood	2 (5)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.28 .19 .16	.20 .15 .13	.16 .13 .11	.13 .11 .10	.11 .10 .09	.10 .09 .08 .07	
	3 (8)	None or Plaster (6) Suspended Plaster (5) Suspended Acou Tile (2)	.21 .16 .13	.16 .13 .11	.13 .11 .10	.11 .09 .09	.10 .08 .07	.09 .08 .07 .06	

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Equations: Summer—(Heat Flow Down) Heat Gain, Btu/hr = (Area, sq ft) × (U value) × (equivalent temp diff, Table 20).

Winter—(Heat Flow Up) Heat Loss, Btu/hr = (Area, sq ft) × (U value × 1.1) × (outdoor temp—inside temp).

\*For addition of air spaces or insulation to roofs, refer to Table 31, page 73.

†For suspended 1/2" insulation board, plain (.6) or with 1/2" sand aggregate plaster (.5), use values of suspended acou tile.

o در محاسبه بار گرمایی (زمستان) مقادیر U مستخرج از جدول فوق باید در 1.1 ضرب شوند.



جدول ۱۲-۱: ضریب کلی هدایت حرارت (U) برای سقف های شیبدار  
 تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازاء واحد سطح سقف ( $\frac{lb}{ft^2}$ )

Btu/(hr) (sq ft projected area) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of component materials.

PITCHED ROOFS		CEILING										
EXTERIOR SURFACE	SHEATHING	None	3/4" Wood Panel (2)	1/2" Gypsum Board (Plaster Board) (2)	Metal Lath Plastered		1/2" Gypsum or Wood Lath Plastered		Insulating Board Plain or 1/2" Sand Agg Plastered		Acoustical Tile on Furring or 1/2" Gypsum	
					3/4" Sand Plaster (7)	3/4" L: Wt Plaster (3)	1/2" Sand Plaster (5)	1/2" L: Wt Plaster (2)	1/2" Board (2)	1" Board (4)	1/2" Tile (2)	3/4" Tile (3)
Asphalt Shingles, (2)	Bldg paper on 3/4" plywood (2)	.51	.27	.30	.32	.29	.29	.28	.22	.17	.23	.21
	Bldg paper on 3/2" wood sheathing (3)	.30	.23	.26	.27	.25	.25	.24	.20	.16	.21	.19
Asbestos-Cement Shingles (3) or Asphalt Roll Roofing (1)	Bldg paper on 3/4" plywood (2)	.59	.28	.34	.37	.33	.33	.31	.25	.18	.25	.22
	Bldg paper on 3/2" wood sheathing (3)	.45	.23	.29	.31	.28	.28	.27	.22	.17	.22	.20
Slates (8) Tile (10) or Sheet Metal (1)	Bldg paper on 3/4" plywood (2)	.64	.29	.36	.38	.34	.35	.47	.26	.19	.26	.23
	Bldg paper on 3/2" wood sheathing (3)	.48	.25	.29	.31	.28	.28	.27	.22	.17	.23	.20
Wood Shingles (2)	Bldg paper on 1" x 4" strips (1)	.53	.26	.31	.33	.30	.30	.28	.23	.17	.24	.21
	Bldg paper on 3/4" plywood (2)	.41	.23	.27	.29	.26	.27	.25	.21	.16	.21	.19
	Bldg paper on 3/2" wood sheathing (3)	.34	.21	.24	.25	.23	.23	.22	.19	.15	.19	.17

1958 ASHAE Guide

Equation: Summer (Heat Flow Down) Heat Gain, Btu/hr = (horizontal projected area, sq ft) x (U value) x (equivalent temp diff, Table 20).

Winter (Heat Flow Up) Heat Loss, Btu/hr = (horizontal projected area, sq ft) x (U value x 1.1) x (outdoor temp - inside temp).

\*For addition of air spaces or insulation for above roofs, refer to Table 31, page 75.

در محاسبه بار گرمایی (زمستان) مقادیر U مستخرج از جدول فوق باید در 1.1 ضرب شوند.

جدول ۱۳-۱: ضریب کلی هدایت حرارت (U) برای سقف و کف (جریان حرارت سمت بالا)

تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازا و واحد سطح سقف یا کف ( $\frac{lb}{ft^2}$ )

Based on Still Air Both Sides, Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of ceiling and floor.

		MASONRY CEILING												
		None or 1/2"				Suspended or Furred								
		THICK-NESS (Inches) and WEIGHT (lb per sq ft)	None or 1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (3)	Acoustical Tile Gleed		Metal Lath Plastered		3/4" Gypsum or Wood Lath Plastered		Insulating Board Plain or 1/2" Sand Agg Plastered		Acoustical Tile on Furring or 3/4" Gypsum	
FLOOR	CONCRETE SUBFLOOR				1/2" Tile (1)	3/4" Tile (1)	3/4" Sand Plaster (7)	1/2" Lt Wt Plaster (3)	1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (2)	1/2" Board (2)	1" Board (4)	1/2" Tile (1)	3/4" Tile (1)
None or 1/2" Linoleum or Floor Tile	Sand Agg	2 (19)	.70	.53	.38	.31	.43	.38	.44	.41	.26	.19	.26	.24
		4 (39)	.63	.49	.36	.30	.41	.36	.41	.38	.25	.18	.26	.23
		6 (59)	.57	.45	.34	.28	.38	.34	.39	.36	.24	.18	.25	.22
		8 (79)	.52	.42	.32	.27	.36	.32	.37	.34	.23	.17	.24	.21
		10 (99)	.48	.39	.31	.26	.34	.31	.35	.32	.23	.17	.23	.21
		Lt Wt Agg 80 lb/ft <sup>3</sup>	2 (15)	.48	.39	.31	.26	.34	.31	.35	.32	.23	.17	.23
	4 (28)	.35	.30	.25	.22	.27	.25	.27	.26	.19	.15	.20	.18	
	6 (41)	.27	.24	.21	.18	.22	.21	.22	.21	.17	.13	.17	.15	
3/4" Wood Block on Slab	Sand Agg	2 (20)	.47	.39	.30	.26	.33	.30	.33	.30	.22	.17	.23	.20
		4 (40)	.44	.36	.29	.25	.31	.28	.32	.28	.22	.16	.22	.20
		6 (60)	.41	.34	.28	.24	.30	.27	.30	.26	.21	.16	.22	.19
		8 (80)	.38	.33	.26	.23	.28	.26	.29	.26	.20	.15	.21	.19
		10 (100)	.36	.31	.25	.22	.27	.25	.27	.25	.19	.15	.20	.18
		Lt Wt Agg 80 lb/ft <sup>3</sup>	2 (15)	.36	.31	.25	.22	.27	.25	.27	.25	.19	.15	.20
	4 (29)	.28	.25	.21	.19	.22	.21	.23	.26	.17	.13	.17	.16	
	6 (42)	.23	.21	.18	.16	.19	.18	.19	.21	.15	.12	.15	.14	
Floor Tile or 1/2" Linoleum on 1/2" Plywood on 2" x 2" Sleepers	Sand Agg	2 (22)	.32	.28	.23	.21	.31	.28	.32	.30	.18	.14	.18	.17
		4 (42)	.31	.27	.23	.20	.30	.27	.30	.28	.18	.14	.18	.17
		6 (62)	.29	.26	.22	.19	.28	.26	.29	.27	.17	.14	.18	.16
		8 (82)	.28	.25	.21	.19	.27	.25	.27	.26	.17	.13	.17	.16
		10 (102)	.27	.24	.20	.18	.26	.24	.26	.25	.16	.13	.17	.15
		Lt Wt Agg 80 lb/ft <sup>3</sup>	2 (19)	.27	.24	.20	.18	.26	.24	.26	.25	.16	.13	.17
	4 (31)	.22	.20	.17	.16	.22	.20	.22	.21	.14	.12	.15	.14	
	6 (44)	.19	.17	.15	.14	.18	.17	.19	.18	.13	.11	.13	.12	
3/4" Hardwood or 3/4" Subfloor on 2" x 2" Sleepers	Sand Agg	2 (24)	.26	.23	.20	.18	.25	.23	.25	.24	.16	.13	.16	.15
		4 (44)	.25	.22	.19	.17	.24	.22	.24	.23	.16	.13	.16	.15
		6 (64)	.24	.21	.19	.17	.23	.21	.23	.22	.15	.12	.16	.14
		8 (84)	.23	.21	.18	.16	.22	.21	.22	.21	.15	.12	.15	.14
		10 (104)	.22	.20	.17	.16	.21	.20	.22	.21	.14	.12	.15	.14
		Lt Wt Agg 80 lb/ft <sup>3</sup>	2 (20)	.22	.20	.17	.16	.21	.20	.22	.21	.14	.12	.15
	4 (33)	.19	.17	.15	.14	.18	.17	.18	.18	.13	.11	.13	.12	
	6 (46)	.16	.15	.14	.13	.16	.15	.16	.16	.12	.099	.12	.11	

		FRAME CONSTRUCTION CEILING												
		None or 1/2"				Suspended or Furred								
		THICK-NESS (Inches) and WEIGHT (lb per sq ft)	None or 1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (3)	Acoustical Tile Gleed		Metal Lath Plastered		3/4" Gypsum or Wood Lath Plastered		Insulating Board Plain or 1/2" Sand Agg Plastered		Acoustical Tile on Furring or 3/4" Gypsum	
FLOOR	SUBFLOOR				1/2" Tile (1)	3/4" Tile (1)	3/4" Sand Plaster (7)	1/2" Lt Wt Plaster (3)	1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (2)	1/2" Board (2)	1" Board (4)	1/2" Tile (1)	3/4" Tile (1)
None	None	3/4" Wood (2)	.45	.30	.26	.21	.74	.59	.61	.54	.37	.24	.39	.31
		2" Wood (5)	.27	.20	.18	.18	.22	.20	.20	.19	.17	.14	.17	.15
1/2" Ceramic Tile on 1 1/2" Cement	3/4" Wood (2)	2" Wood (2)	.38	.21	.19	.19	.26	.26	.24	.24	.20	.16	.21	.19
		2" Wood (2)	.24	.19	.17	.17	.20	.19	.19	.18	.16	.13	.16	.15
3/4" Hardwood Floor or Linoleum on 3/4" Plywood	3/4" Wood (5)	2" Wood (5)	.33	.24	.21	.21	.25	.23	.23	.22	.18	.15	.19	.17
		2" Wood (7)	.22	.17	.16	.16	.18	.17	.17	.17	.15	.12	.15	.14
1/2" Linoleum on 1/2" Hardwood on 3/4" Insulating Board	3/4" Wood (5)	2" Wood (5)	.26	.21	.19	.19	.22	.20	.21	.20	.17	.14	.18	.16
		2" Wood (8)	.20	.16	.15	.15	.17	.16	.16	.16	.14	.12	.14	.13

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Equation: Heat flow up, Unconditioned space below: Heat Gain, Btu/hr = (Area, sq ft) x (U value) x (outdoor temp - inside temp - 5 F).

Kitchen or boiler room below: Heat Gain, Btu/hr = (Area, sq ft) x (U value)

x (actual temp diff, or outdoor temp - inside temp + 15 F to 25 F).

جدول ۱۴-۱: ضریب کلی هدایت حرارت (U) برای سقف و کف (جریان حرارت بسمت پایین)  
 تمام اعداد داخل پرانتز عبارتند از وزن مصالح بازااء واحد سطح سقف یا کف ( $\frac{\text{lb}}{\text{ft}^2}$ )

Based on Still Air Both Sides, Btu/(hr) (sq ft) (deg F temp diff)

All numbers in parentheses indicate weight per sq ft. Total weight per sq ft is sum of ceiling and floor.

		MASONRY CEILING												
		None or 1/2" Sand Plaster (5)				Suspended or Furred				Acoustical Tile on Furring or 3/8" Gypsum				
FLOOR	CONCRETE SUBFLOOR	THICKNESS (Inches) and WEIGHT (lb per sq ft)	None or 1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (3)	Acoustical Tile Glued		Metal Lath Plastered		3/8" Gypsum or Wood Lath Plastered		Insulating Board Plain or 1/2" Sand Agg Plastered		Acoustical Tile on Furring or 3/8" Gypsum	
					1/2" Tile (1)	3/4" Tile (1)	3/8" Sand Plaster (7)	1/2" Lt Wt Plaster (3)	1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (2)	1/2" Board (2)	1" Board (4)	1/2" Tile (1)	3/4" Tile (1)
None or 1/2" Linoleum or Floor Tile	Sand Agg	2 (19)	.48	.43	.31	.26	.32	.29	.30	.28	.23	.17	.23	.20
		4 (39)	.44	.40	.30	.25	.31	.28	.28	.27	.22	.17	.22	.20
		6 (59)	.41	.37	.28	.24	.29	.27	.27	.26	.21	.16	.22	.19
		8 (79)	.39	.35	.27	.23	.28	.26	.26	.25	.21	.16	.21	.19
		10 (99)	.36	.34	.26	.22	.27	.25	.25	.24	.20	.15	.20	.18
		Lt Wt Agg 80 lb/ft <sup>2</sup>		2 (15)	.36	.34	.26	.22	.27	.25	.25	.24	.20	.15
1 1/4" Wood Block on Slab	Sand Agg	2 (20)	.36	.33	.25	.22	.26	.24	.24	.23	.20	.15	.20	.18
		4 (40)	.33	.31	.24	.21	.25	.23	.23	.22	.19	.15	.19	.17
		6 (60)	.32	.29	.23	.21	.24	.22	.22	.21	.18	.15	.18	.17
		8 (80)	.30	.28	.23	.20	.23	.22	.22	.21	.18	.14	.18	.16
		10 (100)	.29	.27	.22	.19	.22	.21	.21	.20	.17	.14	.17	.16
		Lt Wt Agg 80 lb/ft <sup>2</sup>		2 (16)	.29	.27	.22	.19	.22	.21	.21	.20	.17	.14
Floor Tile or 1/2" Linoleum on 3/4" Plywood on 2" x 2" Sleepers	Sand Agg	2 (22)	.33	.31	.24	.21	.25	.23	.23	.22	.19	.15	.20	.17
		4 (42)	.32	.29	.23	.21	.24	.22	.22	.21	.18	.15	.19	.17
		6 (62)	.30	.28	.23	.20	.23	.21	.22	.21	.18	.14	.18	.16
		8 (82)	.29	.27	.22	.19	.22	.21	.21	.20	.17	.14	.18	.16
		10 (102)	.28	.26	.21	.19	.21	.20	.20	.19	.17	.13	.17	.15
		Lt Wt Agg 80 lb/ft <sup>2</sup>		2 (19)	.28	.26	.21	.19	.21	.20	.20	.19	.17	.13
3/4" Hardwood on 1 1/2" Subfloor on 2" x 2" Sleepers	Sand Agg	2 (24)	.26	.25	.20	.18	.20	.20	.20	.19	.16	.13	.17	.15
		4 (44)	.25	.24	.20	.18	.20	.19	.19	.18	.16	.13	.16	.15
		6 (64)	.24	.23	.19	.17	.19	.18	.19	.18	.15	.13	.16	.14
		8 (84)	.23	.22	.19	.17	.19	.18	.18	.17	.15	.12	.15	.14
		10 (104)	.22	.21	.18	.16	.18	.17	.17	.17	.14	.12	.15	.14
		Lt Wt Agg 80 lb/ft <sup>2</sup>		2 (20)	.22	.21	.18	.16	.18	.17	.17	.17	.14	.12
None	None	2 (20)	.22	.21	.18	.16	.18	.17	.17	.17	.14	.12	.15	.14
		4 (33)	.19	.18	.16	.14	.16	.15	.15	.15	.13	.11	.13	.12
		6 (46)	.16	.16	.14	.13	.14	.14	.14	.13	.12	.10	.12	.11
		2 (20)	.22	.21	.18	.16	.18	.17	.17	.17	.14	.12	.15	.14
		4 (33)	.19	.18	.16	.14	.16	.15	.15	.15	.13	.11	.13	.12
		6 (46)	.16	.16	.14	.13	.14	.14	.14	.13	.12	.10	.12	.11

		FRAME CONSTRUCTION CEILING											
		None				Suspended or Furred				Acoustical Tile on Furring or 3/8" Gypsum			
FLOOR	SUBFLOOR	None	Acoustical Tile Glued		Metal Lath Plastered		3/8" Gypsum or Wood Lath Plastered		Insulating Board Plain or 1/2" Sand Agg Plastered		Acoustical Tile on Furring or 3/8" Gypsum		
			1/2" Tile (1)	3/4" Tile (1)	3/8" Sand Plaster (7)	1/2" Lt Wt Plaster (3)	1/2" Sand Plaster (5)	1/2" Lt Wt Plaster (2)	1/2" Board (2)	1" Board (4)	1/2" Tile (1)	3/4" Tile (1)	
None	None	.35	.25	.22	.51	.43	.44	.40	.31	.21	.31	.27	
	1 1/2" Wood (2)	.27	.18	.16	.26	.24	.24	.23	.19	.15	.20	.17	
1/2" Ceramic Tile on 1/2" Cement	1 1/2" Wood (21)	.38	.18	.17	.19	.18	.18	.17	.15	.12	.15	.14	
	2" Wood (24)	.24	.14	.13	.15	.14	.14	.14	.12	.11	.12	.12	
1 1/4" Hardwood Floor or Linoleum on 3/4" Plywood	1 1/2" Wood (5)	.33	.17	.16	.18	.17	.17	.16	.14	.12	.14	.13	
	2" Wood (7)	.22	.14	.13	.14	.13	.13	.13	.12	.10	.12	.11	
1/2" Linoleum on 1/2" Hardboard on 3/8" Insulating Board	1 1/2" Wood (5)	.29	.16	.15	.16	.15	.16	.15	.13	.11	.14	.13	
	2" Wood (8)	.20	.13	.12	.13	.12	.13	.12	.11	.10	.11	.11	

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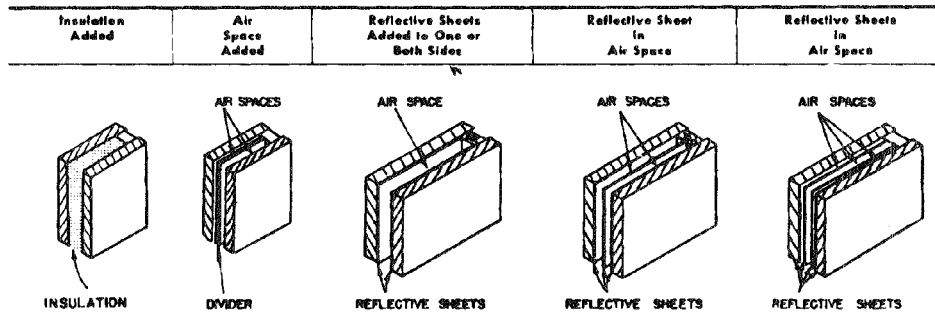
Equation: Heat flow down, unconditioned space above: Heat Gain, Btu/hr = (Area, sq ft) x (U value) x (outdoor temp - inside temp - 5 F).  
 Kitchen above: Heat Gain, Btu/hr = (Area, sq ft) x (U value) x (actual temp diff, or outdoor temp - inside temp + 15 F to 25 F).

جدول ۱۵-۱: ضریب کلی هدایت حرارت (U) برای دیوار، سقف یا کف باعایق ولایه هوا

Btu/(hr) (sq ft) (deg F temp diff)

U Value Before Adding Insul. Wall, Ceiling, Roof Floor	Addition of Fibrous Insulation			Add'n of Air Space % <sup>a</sup> or more	Addition of Reflective Sheets to Air Space (Aluminum Foil Average Emissivity = .05)								
					Direction of Heat Flow								
	Thickness (Inches)				Winter and Summer Horizontal			Summer Down			Winter Up		
	1	2	3		Added to one or both sides	One sheet in air space	Two sheets in air space	Added to one or both sides	One sheet in air space	Two sheets in air space	Added to one or both sides	One sheet in air space	Two sheets in air space
.60	.19	.11	.08	.38	.34	.18	.11	.12	.06	.05	.36	.20	.14
.58	.19	.11	.08	.37	.33	.18	.11	.12	.06	.05	.36	.20	.14
.56	.18	.11	.08	.36	.32	.18	.11	.11	.06	.05	.35	.20	.14
.54	.18	.11	.08	.36	.31	.17	.11	.11	.06	.05	.34	.19	.14
.52	.18	.11	.08	.35	.30	.17	.10	.11	.06	.05	.33	.19	.14
.50	.18	.11	.08	.34	.29	.17	.10	.11	.06	.05	.32	.19	.13
.48	.17	.11	.08	.33	.28	.16	.10	.11	.06	.04	.31	.18	.13
.46	.17	.10	.08	.32	.28	.16	.10	.11	.06	.04	.30	.18	.13
.44	.17	.10	.07	.31	.27	.16	.10	.11	.06	.04	.29	.18	.13
.42	.16	.10	.07	.30	.26	.15	.10	.11	.06	.04	.28	.17	.13
.40	.16	.10	.07	.29	.26	.15	.10	.10	.06	.04	.27	.17	.12
.38	.16	.10	.07	.28	.25	.15	.09	.10	.06	.04	.26	.17	.12
.36	.15	.10	.07	.27	.24	.14	.09	.10	.06	.04	.25	.16	.12
.34	.15	.10	.07	.26	.23	.14	.09	.10	.06	.04	.24	.16	.12
.32	.15	.10	.07	.25	.22	.13	.09	.10	.05	.04	.23	.15	.11
.30	.14	.09	.07	.23	.21	.13	.09	.10	.05	.04	.22	.15	.11
.28	.14	.09	.07	.22	.20	.13	.08	.09	.05	.04	.20	.14	.10
.26	.13	.09	.07	.21	.19	.12	.08	.09	.05	.04	.19	.13	.10
.24	.13	.09	.07	.20	.17	.12	.08	.09	.05	.04	.18	.13	.10
.22	.12	.08	.06	.18	.16	.11	.08	.08	.05	.04	.16	.12	.09
.20	.12	.08	.06	.17	.15	.10	.07	.08	.05	.04	.15	.11	.09
.18	.11	.08	.06	.15	.14	.10	.07	.08	.05	.04	.14	.11	.08
.16	.10	.07	.06	.14	.12	.09	.07	.07	.05	.04	.13	.10	.08
.14	.09	.07	.05	.12	.11	.08	.06	.07	.04	.04	.12	.09	.07
.12	.08	.06	.05	.11	.10	.08	.06	.06	.04	.03	.10	.08	.07
.10	.07	.06	.05	.09	.08	.07	.05	.06	.04	.03	.09	.07	.06

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<sup>a</sup>Checked for summer conditions for up, down and horizontal heat flow. Error from above values is less than 1%.

جدول ۱۶-۱: ضریب کلی هدایت حرارت (U) برای سقف طبقه آخر (زیربام) وقتی که بام عایق کاری شود

Btu/(hr) (sq ft) (deg F temp diff)

U VALUE OF ROOF BEFORE ADDING ROOF DECK INSULATION	Addition of Roof-Deck Insulation Thickness (in.)					
	1/2	1	1 1/2	2	2 1/2	3
.60	.33	.22	.17	.14	.12	.10
.50	.29	.21	.16	.14	.12	.10
.40	.26	.19	.15	.13	.11	.09
.35	.24	.18	.14	.12	.10	.09
.30	.21	.16	.13	.12	.10	.09
.25	.19	.15	.12	.11	.09	.08
.20	.16	.13	.11	.10	.09	.08
.15	.12	.11	.09	.08	.08	.07
.10	.09	.09	.07	.07	.06	.05

جدول ۱۷-۱: ضریب کلی هدایت حرارت (U) برای پنجره‌ها و درها

Btu/(hr) (sq ft) (deg F tempdiff)

نوع پنجره یا در	U
پنجره تک شیشه ای معمولی	1.13
پنجره با دولایه شیشه بافاصله 1/2"	0.65
پنجره با سه لایه شیشه بافاصله 1/2"	0.36
پنجره طوفان	0.56
در تمام چوبی ضخامت 1"	0.70
در تمام چوبی ضخامت 2"	0.45
در چوبی با کتیبه شیشه ای	0.75
در تمام شیشه ای باقاب چوبی	0.95
در تمام فلزی	1.20
در فلزی با کتیبه شیشه ای	1.15
در تمام شیشه ای باقاب فلزی	1.05
در ورودی راهرو، تمام چوبی	0.30
در ورودی راهرو، نصف شیشه	0.45
در ورودی راهرو، تمام شیشه	0.60

جدول ۱۸ - ۱ : مقاومت حرارتی مصالح ساختمانی (R)

(deg F per Btu) / (hr) (sq ft)

MATERIAL	DESCRIPTION	THICKNESS (in.)	DENSITY (lb per cu ft)	WEIGHT (lb per sq ft)	RESISTANCE R	
					Per Inch Thickness $\frac{1}{k}$	Per Listed Thickness $\frac{1}{c}$
<b>BUILDING MATERIALS</b>						
<b>BUILDING BOARD</b> Boards, Panels, Sheathing, etc	Asbestos-Cement Board	3/8	120	—	0.25	—
	Asbestos-Cement Board	1/2	120	1.25	—	0.03
	Gypsum or Plaster Board	3/8	50	1.58	—	0.32
	Gypsum or Plaster Board	1/2	50	2.08	—	0.45
	Plywood	3/4	34	—	1.25	—
	Plywood	1/2	34	0.71	—	0.31
	Plywood	3/8	34	1.06	—	0.47
	Plywood	1/2	34	1.42	—	0.63
	Plywood or Wood Panel	3/4	34	2.13	—	0.94
	Wood Fiber Board, Laminated or Homogeneous	3/4	26	—	2.38	—
	Wood Fiber Board, Laminated or Homogeneous	1	31	—	2.00	—
	Wood Fiber, Hardboard Type	3/4	65	—	0.72	—
	Wood Fiber, Hardboard Type	1	65	1.35	—	0.18
Wood, Fir or Pine Sheathing	3/8	32	2.08	—	0.98	
Wood, Fir or Pine	1 1/4	32	4.34	—	2.03	
<b>BUILDING PAPER</b>	Vapor Permeable Felt	—	—	—	—	0.06
	Vapor Seal, 2 Layers of Mopped 15 lb felt	—	—	—	—	0.12
	Vapor Seal, Plastic Film	—	—	—	—	Negl
<b>WOODS</b>	Maple, Oak, and Similar Hardwoods	—	45	—	0.91	—
	Fir, Pine, and Similar Softwoods	—	32	—	1.25	—
<b>MASONRY UNITS</b>	Brick, Common	4	120	40	—	.80
	Brick, Face	4	130	43	—	.44
	Clay Tile, Hollow:	—	—	—	—	—
	1 Cell Deep	3	60	15	—	0.80
	1 Cell Deep	4	48	16	—	1.11
	2 Cells Deep	6	50	25	—	1.52
	2 Cells Deep	8	45	30	—	1.65
	2 Cells Deep	10	42	35	—	2.22
	3 Cells Deep	12	40	40	—	2.50
	Concrete Blocks, Three Oval Core	3	76	19	—	0.40
	Sand & Gravel Aggregate	4	69	23	—	0.71
	Sand & Gravel Aggregate	6	64	32	—	0.91
	Sand & Gravel Aggregate	8	64	43	—	1.11
	Sand & Gravel Aggregate	12	63	63	—	1.28
	Cinder Aggregate	3	68	17	—	0.66
	Cinder Aggregate	4	60	20	—	1.11
	Cinder Aggregate	6	54	27	—	1.50
	Cinder Aggregate	8	56	37	—	1.72
	Cinder Aggregate	12	53	53	—	1.89
	Lightweight Aggregate (Expanded Shale, Clay, Slate or Slag; Pumice)	3	60	15	—	1.27
	Lightweight Aggregate (Expanded Shale, Clay, Slate or Slag; Pumice)	4	52	17	—	1.50
	Lightweight Aggregate (Expanded Shale, Clay, Slate or Slag; Pumice)	8	48	32	—	2.00
	Lightweight Aggregate (Expanded Shale, Clay, Slate or Slag; Pumice)	12	43	43	—	2.27
Gypsum Partition Tile:	—	—	—	—	—	—
3"x12"x30" solid	3	45	11	—	1.26	
3"x12"x30" 4-cell	3	35	9	—	1.33	
4"x12"x30" 3-cell	4	38	13	—	1.67	
Stone, Lime or Sand	—	150	—	—	0.08	—
<b>MASONRY MATERIALS</b> Concretes	Cement Mortar	—	116	—	0.20	—
	Gypsum-Fiber Concrete 87 1/2% gypsum, 12 1/2% wood chips	—	51	—	0.60	—
	Lightweight Aggregates including Expanded Shale, Clay or Slate	—	120	—	0.19	—
	Lightweight Aggregates including Expanded Shale, Clay or Slate	—	100	—	0.28	—
	Expanded Slag; Cinders	—	80	—	0.40	—
	Pumice; Perlite; Vermiculite	—	60	—	0.59	—
	Pumice; Perlite; Vermiculite	—	40	—	0.86	—
	Also, Cellular Concretes	—	30	—	1.11	—
	Also, Cellular Concretes	—	20	—	1.43	—
	Sand & Gravel or Stone Aggregate (Oven Dried)	—	140	—	0.11	—
Sand & Gravel or Stone Aggregate (Not Dried)	—	140	—	0.08	—	
Stucco	—	116	—	0.20	—	
<b>PLASTERING MATERIALS</b>	Cement Plaster, Sand Aggregate	—	116	—	0.20	—
	Sand Aggregate	1/2	116	4.8	—	0.16
	Sand Aggregate	3/4	116	7.2	—	0.13
	Gypsum Plaster:	—	—	—	—	—
	Lightweight Aggregate	1/2	45	1.88	—	0.32
	Lightweight Aggregate	3/4	45	2.34	—	0.39
	Lightweight Aggregate on Metal Lath	3/8	45	2.80	—	0.47
	Perlite Aggregate	—	45	—	0.67	—
	Sand Aggregate	—	105	—	0.18	—
	Sand Aggregate	1/2	105	4.4	—	0.09
	Sand Aggregate	3/4	105	5.5	—	0.11
	Sand Aggregate on Metal Lath	3/8	105	6.6	—	0.13
	Sand Aggregate on Wood Lath	—	105	—	—	0.40
Vermiculite Aggregate	—	45	—	0.59	—	
<b>ROOFING</b>	Asbestos-Cement Shingles	—	120	—	—	0.21
	Asphalt Roll Roofing	—	70	—	—	0.15
	Asphalt Shingles	—	70	—	—	0.44
	Built-up Roofing	3/8	70	2.2	—	0.33
	Slate	1/2	201	8.4	—	0.05
	Sheet Metal	—	—	—	Negl	—
	Wood Shingles	—	40	—	—	0.94

ادامه دارد...

دنبالہ جدول ۱۸-۱: مقاومت حرارتی مصالح ساختمانی (R)

(deg F per Btu) / (hr) (sq ft)

MATERIAL	DESCRIPTION	THICKNESS (in.)	DENSITY (lb per cu ft)	WEIGHT (lb per sq ft)	RESISTANCE R		
					Per Inch Thickness $\frac{1}{k}$	For Listed Thickness $\frac{l}{k}$	
<b>INSULATING MATERIALS</b>							
<b>SIDING MATERIALS</b> (On Flat Surface)	Shingles						
	Wood, 16", 7 1/2" exposure		—	—	—	0.87	
	Wood, Double, 16", 12" exposure		—	—	—	1.19	
	Wood, Plus Insul Backer Board, 3/8"		—	—	—	1.40	
	Siding						
	Asbestos-Cement, 1/4" lapped		—	—	—	0.21	
	Asphalt Roll Siding		—	—	—	0.15	
	Asphalt Insul Siding, 1/2" Board		—	—	—	1.65	
	Wood, Drop, 1" x 8"		—	—	—	0.79	
	Wood, Bevel, 1/2" x 8", lapped		—	—	—	0.81	
Wood, Bevel, 3/4" x 10", lapped		—	—	—	1.05		
Wood, Plywood, 3/4", lapped		—	—	—	0.59		
Structural Glass			—	—	—	0.10	
<b>FLOORING MATERIALS</b>	Asphalt Tile	3/8"	120	1.25	—	0.04	
	Carpet and Fibrous Pad		—	—	—	2.08	
	Carpet and Rubber Pad		—	—	—	1.29	
	Ceramic Tile	1"	—	—	—	0.08	
	Cork Tile		25	—	2.22	—	
	Cork Tile	3/8"	25	0.26	—	0.28	
	Felt, Flooring		—	—	—	0.06	
	Floor Tile	3/8"	—	—	—	0.05	
	Linoalum	3/8"	80	0.83	—	0.08	
	Plywood Subfloor	3/8"	34	1.77	—	0.78	
	Rubber or Plastic Tile	3/8"	110	1.15	—	0.02	
	Terrazzo	1"	140	11.7	—	0.08	
	Wood Subfloor	3/8"	32	2.08	—	0.98	
Wood, Hardwood Finish	3/8"	45	2.81	—	0.88		
<b>BLANKET AND BATT*</b>	Cotton Fiber		0.8 - 2.0	—	3.85	—	
	Mineral Wool, Fibrous Form Processed From Rock, Slag, or Glass		1.5 - 4.0	—	3.70	—	
	Wood Fiber		3.2 - 3.6	—	4.00	—	
	Wood Fiber, Multi-layer Stitched Expanded		1.5 - 2.0	—	3.70	—	
	Glass Fiber		9.5	—	4.00	—	
<b>BOARD AND SLABS</b>	Wood or Cane Fiber						
	Acoustical Tile	1/2"	22.4	.93	—	1.19	
	Acoustical Tile	3/4"	22.4	1.4	—	1.78	
	Interior Finish (Tile, Lath, Plank)		15.0	—	2.86	—	
	Interior Finish (Tile, Lath, Plank)	1/2"	15.0	0.62	—	1.43	
	Roof Deck Slab						
	Sheathing (Impreg or Coated)		20.0	—	2.63	—	
	Sheathing (Impreg or Coated)	1/2"	20.0	0.83	—	1.32	
	Sheathing (Impreg or Coated)	3/8"	20.0	1.31	—	2.06	
	Cellular Glass		9.0	—	2.50	—	
Cork Board (Without Added Binder)		6.5 - 8.0	—	3.70	—		
Hog Hair (With Asphalt Binder)		8.5	—	3.00	—		
Plastic (Foamed)		1.62	—	3.45	—		
Wood Shredded (Cemented in Preformed Slabs)		22.0	—	1.82	—		
<b>LOOSE FILL</b>	Macerated Paper or Pulp Products		2.5 - 3.5	—	3.57	—	
	Wood Fiber: Redwood, Hemlock, or Fir		2.0 - 3.5	—	3.33	—	
	Mineral Wool (Glass, Slag, or Rock)		2.0 - 5.0	—	3.33	—	
	Sawdust or Shavings		8.0 - 15.0	—	2.22	—	
	Vermiculite (Expanded)		7.0	—	2.08	—	
<b>ROOF INSULATION</b>	All Types						
	Preformed, for use above deck						
	Approximately	1/2"	15.6	.7	—	1.39	
	Approximately	1"	15.6	1.3	—	2.78	
	Approximately	1 1/2"	15.6	1.9	—	4.17	
	Approximately	2"	15.6	2.6	—	5.26	
	Approximately	2 1/2"	15.6	3.2	—	6.67	
Approximately	3"	15.6	3.9	—	8.33		
<b>AIR</b>							
<b>AIR SPACES</b>	POSITION	HEAT FLOW					
	Horizontal	Up (Winter)	3/4" - 4"	—	—	0.85	
	Horizontal	Up (Summer)	3/4" - 4"	—	—	0.78	
	Horizontal	Down (Winter)	3/4"	—	—	1.02	
	Horizontal	Down (Winter)	1 1/2"	—	—	1.15	
	Horizontal	Down (Winter)	4"	—	—	1.23	
	Horizontal	Down (Winter)	8"	—	—	1.25	
	Horizontal	Down (Summer)	3/4"	—	—	0.85	
	Horizontal	Down (Summer)	1 1/2"	—	—	0.93	
	Horizontal	Down (Summer)	4"	—	—	0.99	
	Horizontal	Up (Winter)	3/4" - 4"	—	—	0.90	
	Sloping 45°	Down (Summer)	3/4" - 4"	—	—	0.89	
	Vertical	Horiz. (Winter)	3/4" - 4"	—	—	0.97	
Vertical	Horiz. (Summer)	3/4" - 4"	—	—	0.86		
<b>AIR FILM</b>	POSITION	HEAT FLOW					
	Horizontal	Up		—	—	0.61	
	Sloping 45°	Up		—	—	0.62	
	<b>Still Air</b>	Vertical	Horizontal		—	—	0.68
		Sloping 45°	Down		—	—	0.76
		Horizontal	Down		—	—	0.92
	<b>15 Mph Wind</b>	Any Position (For Winter)	Any Direction		—	—	0.17
<b>7 1/2 Mph Wind</b>		Any Position (For Summer)	Any Direction		—	—	0.25

جدول ۱۹-۱: شرایط طرح خارج تابستانی و زمستانی برای چند شهر ایران

نام شهر	تابستان			عرض جغرافیایی درجه	ارتفاع از سطح دریا فوت
	دمای خشک F	دمای مرطوب F	دامنه تغییرات* روزانه F (Daily Range)		
آبادان	115	81	32	30	7
اراک	97	70	30	34	5780
ارومیه	93	72	27	38	4400
اصفهان	100	68	29	33	5200
اهواز	115	80	35	31	66
ایرانشهر	115	84	29	27	1870
بابلسر	92	82	15	37	0
بندرانزلی	90	82	15	37	0
بندرعباس	105	90	16	27	30
بندرلنگه	110	98	15	27	43
بندرماهشهر	110	86	15	30	40
بوشهر	105	87	16	29	46
بیرجند	103	74	30	33	4800
تبریز	95	86	24	38	4500
تهران	100	74	27	35	4000
چابهار	104	90	12	25	20
خارک	105	90	16	28	0
خرم آباد	105	78	33	33	4000
خرمشهر	115	80	35	30	0
دزفول	115	79	31	32	500
رامسر	90	70	13	37	0

دنباله جدول ۱۹-۱: شرایط طرح خارج تابستانی و زمستانی برای چند شهر ایران

نام شهر	تابستان			عرض جغرافیایی درجه	ارتفاع از سطح دریا فوت
	دمای خشک F	دمای مرطوب F	دامنه تغییرات* روزانه F (Daily Range)		
رشت	90	83	22	37	0
زابل	116	84	27	31	1600
زاهدان	105	76	32	29	4500
زنجان	95	72	31	37	5400
سبزوار	100	75	31	36	3100
سقز	97	75	37	36	4900
سمنان	105	79	25	36	3800
سنندج	100	72	33	35	5000
شاهرود	96	74	28	36	4500
شمیران	95	70	30	35	5600
شیراز	100	70	35	30	5000
طبرس	113	78	33	34	3000
فسا	105	77	31	29	4600
فزرین	102	76	31	36	4300
کاشان	110	83	29	34	3150
کرمان	100	72	33	30	5800
کرمانشاه	100	65	42	34	4600
گرگان	102	85	19	37	400
مشهد	96	67	29	36	3104
همدان	95	63	38	35	5500
یزد	105	76	28	32	4000

\* دامنه تغییرات روزانه دمای خشک (Daily Range) عبارتست از اختلاف دمای حداکثر و حداقل در طول مدت ۲۴ ساعت شبانه روز در شهر مورد نظر.

جدول ۲۰-۱: تصحیح دمای طرح خارج برای ساعات مختلف روز (در محاسبه بار سرمایی ساختمان)

DAILY RANGE OF TEMPERATURE* (F)	DRY- OR WET- BULB	SUN TIME									
		AM					PM				
		8	10	12	2	3	4	6	8	10	12
10	Dry-Bulb	-9	-7	-5	-1	0	-1	-2	-5	-8	-9
	Wet-Bulb	-2	-2	-1	0	0	0	-1	-1	-2	-2
15	Dry-Bulb	-12	-9	-5	-1	0	-1	-2	-6	-10	-14
	Wet-Bulb	-3	-2	-1	0	0	0	-1	-1	-3	-4
20	Dry-Bulb	-14	-10	-5	-1	0	-1	-3	-7	-11	-16
	Wet-Bulb	-4	-3	-1	0	0	0	-1	-2	-3	-4
25	Dry-Bulb	-16	-10	-5	-1	0	-1	-5	-8	-13	-18
	Wet-Bulb	-4	-3	-1	0	0	0	-1	-2	-3	-5
30	Dry-Bulb	-18	-12	-6	-1	0	-1	-4	-10	-15	-21
	Wet-Bulb	-5	-3	-1	0	0	0	-1	-3	-4	-6
35	Dry-Bulb	-21	-14	-7	-1	0	-1	-6	-12	-18	-24
	Wet-Bulb	-6	-4	-2	0	0	0	-1	-3	-5	-7
40	Dry-Bulb	-24	-16	-8	-1	0	-1	-7	-14	-21	-28
	Wet-Bulb	-7	-4	-2	0	0	0	-2	-4	-6	-9
45	Dry-Bulb	-26	-17	-8	-2	0	-2	-8	-16	-24	-31
	Wet-Bulb	-7	-5	-2	0	0	-1	-2	-4	-8	-10

فرمول: مقدار تصحیحی از جدول فوق + دمای طرح خارج از جدول ۱۹-۱ = دمای طرح خارج در ساعت مورد نظر



جدول ۲۱-۱: شرایط طرح داخل تابستانی و زمستانی براساس شرایط آسایش انسان

نوع ساختمان	تابستان					زمستان				
	محل های نوکس		محل های معمولی			باررطوبت زنی			بدون رطوبت زنی	
	دمای خشک F	رطوبت نسبی %	دمای خشک F	رطوبت نسبی %	نوسان دما* F	دمای خشک F	رطوبت نسبی %	نوسان دما F	دمای خشک F	نوسان دما F
آپارتمان، منزل مسکونی، هتل، بیمارستان، اداره، مدرسه و غیره	74-76	50-45	77-79	50-45	2-4	74-76	35-30	3 تا 4	75-77	-4
مکانهای بامدت اشغال محدود: بانک، آرایشگاه، فروشگاه، سوپرمارکت و غیره	76-78	50-45	78-80	50-45	2-4	72-74	35-30	3 تا 4	73-75	-4
مکانهایی با گرمای نهان زیاد: تالار کنفرانس، مسجد، کلیسا، رستوران، تئاتر و سینما و غیره	76-78	55-50	78-80	60-65	1-2	72-74	40-35	2 تا 3	74-76	-4
ساختمانهای صنعتی و کارخانجات: سالن اجتماعات، سالن ماشین آلات و غیره.	77-80	55-45	80-85	60-50	3-6	68-72	36-30	4 تا 6	70-74	-6

• مقادیر ارائه شده در ستون نوسان دما برای تنظیم ترموستات اتاقی بکار می روند.  
 •• برای اتاق هایی که سطح شیشه آنها زیاد است و یادیوارهای مشرف به خارج آنها خوب عایق کاری نشده اند، باید دمای خشک را برابر حداکثر میزانی که در جدول پیشنهاد شده در نظر گرفت.

جدول ۲۲-۱: دماهای طرح داخل زمستانی برای ساختمانهای مختلف

نوع محل	دمای طرح داخل F	نوع محل	دمای طرح داخل F
منزل مسکونی	73-75	اتاق خصوصی	72-74
فروشگاهها	65-68	اتاق جراحی	70-95
ساختمانهای عمومی	72-74	حمام	70
کارخانجات	60-65	اتاق خواب و حمام	75
راهروها	55-68	اتاق غذاخوری	72
کلاس درس	72-74	دفاتر کار	68-74
سالن اجتماعات	67-72	تئاتر و سینما	68-72
توالیت	68-70	آشپزخانه ها	66

جدول ۲۳-۱: شرایط طرح داخلی برای کارخانجات با توجه به نوع محصولات تولیدی

(Listed conditions are only typical; final design conditions are established by customer requirements)

INDUSTRY	PROCESS	DRY-BULB (F)	RH (%)	INDUSTRY	PROCESS	DRY-BULB (F)	RH (%)	
ABRASIVE	Manufacture	75-80	45-50	CERAMICS	Refractory Molding Rm.	110-150	50-90	
BAKERY	Fermenting Proof Box	75-82	70-75		Clay Storage	80	40-70	
	Bread Cooler	92-96	80-85		Decal & Decorating	40-80	35-65	
	Cold Room	70-80	80-85	CEREAL	Packaging	75-80	45-50	
	Make-up Rm.	40-45	—	COSMETICS	Mfg.	65-70	—	
	Cake Mixing	78-82	65-70		DISTILLING	Storage—		
	Croakers & Blacoffs	95-105	—			Grain	60	35-40
	Wrapping	60-65	50			Liquid Yeast	32-34	—
	Storage—	60-65	60-65		Mfg.	60-75	45-60	
	Dried Ingrid.	70	55-65		Aging	65-72	50-60	
	Fresh Ingrid.	30-45	80-85	ELECTRICAL PRODUCTS	Electronic & X-ray Colls & Trans.			
	Flour	70-75	50-65			Winding	72	15
	Shortening	45-70	55-60			Tube Assm.	68	40
	Sugar	80	35			Electrical Inst. Mfg. & Lab.	70	50-55
	Water	32-35	—			Thermostat Assm. & Calib.	76	50-55
Wax Paper	70-80	40-50			Humidistat Assm. & Calib.	76	50-55	
BREWERY	Storage—					Close Tol. Assm.	72	40-45
	Hops	30-32	55-60			Meter Assm. Test Switchgear—	74-76	60-63
	Grain	80	60			Fuse & Cut-Out Assm.	73	50
	Liquid Yeast	32-34	75			Cap. Winding	73	50
	Lager	32-35	75			Paper Storage	73	50
	Ale	40-45	75			Conductor Wrapping	75	65-70
	Fermenting Cellar—					Lightning Arrestor	68	20-40
	Lager	40-45	75			Circuit Brkr. Assm. & Test	76	30-60
	Ale	55	75		Rectifiers—			
	Racking Cellar	32-35	75		Process Selenium & Copper Oxide Plates	74	30-40	
CANDY—CHOCOLATE	Candy Centers	80-85	40-50	FURS	Drying	110	—	
	Hand Dipping Rm.	60-65	50-55		Shock Treatment	18-20	—	
	Enrobing Rm.	75-80	55-60		Storage	40-50	55-65	
	Enrobing—			GLASS	Cutting Vinyl Lam. Rm.	55	Comfort	
	Loading End	80	30					
	Enrober	90	13	LEATHER	Drying—			
	Stringing	70	40-50			Veg. Tanned	70	75
	Tunnel	40-45	DP — 40			Chrome Tanned	120	75
Packing	65	55			Storage	50-60	40-60	
CANDY—HARD	Pan Specialty Rm.	70-75	45	LENSES—OPTICAL	Fusing		Comfort	
	General Storage	65-70	40-50			Grinding	80	50
	Mfg.	75-80	30-40	MATCHES	Mfg.	72-74	50	
	Mixing & Cooling	75-80	40-45			Drying	70-75	40
	Tunnel	55	DP — 55			Storage	60-62	50
	CHEWING GUM	Packing	65-75	40-45	MUNITIONS	Metal Percussion Elements—		
Storage		65-75	45-50			Drying Parts	190	—
Drying—Jellies, Gums		120-150	15			Drying Paints	110	—
Cold Rm.—Marshmallow		75-80	45-50			Black Powder Drying Condition & Load	125	—
Mfg.	77	33		Powder Type Fuse		70	40	
Balling	68	63		Lead Tracer Pellets		80	40	
Stripping	72	53						
Breaking	74	47						
Wrapping	74	58						

ادامه دارد...

• در جدول فوق هر جا لغت comfort (آسایش) بکار رفته، باید شرایط طرح داخلی را از جدول ۲۱-۱ استخراج نمود.

دنباله جدول ۲۳ - ۱: شرایط طرح داخل برای کارخانجات با توجه به نوع محصولات تولیدی

(Listed conditions are only typical; final design conditions are established by customer requirements)

INDUSTRY	PROCESS	DRY-BULB (°F)	RM (%)	
PHARMACEUTICAL	Powder Storage			
	Before Mfg.	70-80	30-35	
	After Mfg.	75-80	15-35	
	Milling Rm.	80	35	
	Tablet Compressing	70-80	40	
	Tablet Coating	80	35	
	Effervescent—			
	Tablet & Powder	90	15	
	Hypodermic Tablet	75-80	30	
	Coffolds	70	30-50	
	Cough Syrup	80	40	
	Glandular Prod.	78-80	5-10	
	Ampule Mfg.	80	35	
	Gelatin Capsule	78	40-50	
	Capsule Storage	75	35-40	
PHOTO MATERIAL	Mfg.—			
	Thermo Setting Compounds	80	25-30	
	Cellophane	75-80	45-65	
	Drying	20-125	40-80	
	Cutting & Packing	65-75	40-70	
	Storage—			
	Film Base, Film Paper, Coated Paper	70-75	40-65	
	Safety Film	60-80	45-50	
	Nitrate Film	40-50	40-50	
	Mfg.—			
PLASTIC	Mfg.—			
	Thermo Setting Compounds	80	25-30	
	Cellophane	75-80	45-65	
PLYWOOD	Hot Press—Resin	90	60	
	Cold Press	90	15-25	
PRECISION MACHINING	Spectrographic Anal.		Comfort	
	Gear Matching & Assem.	75-80	35-40	
	Storage—			
	Gasket	100	50	
	Cement & Glue	65	40	
	Machinings		Comfort	
	Gaging, Assem. Adjusting Precision Parts			
	Honing	75-80	35-45	
	PRINTING	Multicolor Litho.		
		Pressroom	75-80	46-48
Stoicroom		73-80	49-51	
Sheet & Web Prod. Storage, Folding, etc.			Comfort	
REFRIGERATION EQUIPMENT	Valve Mfg.	75	40	
	Compressor Assem.	70-76	30-45	
	Refrigerator Assem.		Comfort	
	Testing	65-82	47	
RUBBER DIPPED GOODS	Mfg.	90	—	
	Covering	80	25-30	
	Surgical Articles	75-90	25-30	
	Storage Before Mfg.	60-75	40-50	
	Lab. (ASTM Std.)	73.4	50	
TEXTILES	Cotton			
	Opening & Picking	70-75	35-70	
	Carding	85-87	50-55	
	Drawing & Roving	80	35-60	
TEXTILES (cont.)	Cotton, cont.			
	Ring Spinning			
	Conventional	80-85	40-70	
	Long Draft	80-85		
	Frame Spinning	80-85	55-60	
	Spooling, Winding	78-80	40-65	
	Weaving	78-80	70-85	
	Cloth Room	75	45-70	
	Combing	75	55-65	
	Linen			
Carding, Spinning	75-80	60		
Weaving	80	80		
Woolens				
Pickers	80-85	60		
Carding	80-85	65-70		
Spinning	80-85	50-60		
Dressing	75-80	60		
Weaving—				
Light Goods	80-85	55-70		
Heavy	80-85	60-65		
Drawing	75	60-60		
Worsteeds				
Carding, Combing, & Gilling	80-85	60-70		
Storage	70-85	75-80		
Drawing	80-85	50-70		
Cap Spinning	80-85	50-55		
Spooling, Winding	75-80	55-60		
Weaving	80	50-60		
Finishing	75-80	60		
Silk				
Prep. & Dressing	80	40-65		
Weaving & Spinning	80	65-70		
Throwing	80	60		
Rayon				
Spinning	80-90	50-60		
Throwing	80	55-60		
Weaving				
Regenerated	80	30-60		
Acetate	80	35-40		
Spun Rayon	80	80		
Picking	75-80	50-60		
Carding, Roving, Drawing	80-90	50-60		
Knitting				
Viscose or Cuprammonium	80-85	65		
Synthetic Fiber				
Prep. & Weaving				
Viscose	80	60		
Celconese	80	70		
Nylon	60	50-60		
TOBACCO	Cigar & Cigarette Mfg.	70-75	55-65	
	Softening	90	65-80	
	Stemming & Stripping	75-85	75	
	Storage & Prep.	78	70	
	Conditioning	75	75	
	Packing & Shipping	75	60	

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