

gas, and may be stated as follows: *With temperature constant, the volume of a given weight of gas varies inversely as its absolute pressure.* Hence, if P_1 and P_2 represent the initial and final absolute pressures, and V_1 and V_2 represent corresponding volumes of the same mass, say one pound of

TABLE 7. PROPERTIES OF DRY AIR^a

Barometric Pressure 29.921 In.

TEMPERATURE, DEG. FAHR.	WEIGHT PER CUBIC FOOT, POUND	RATIO OF VOLUME TO VOLUME AT 70 DEG. FAHR.	B.T.U. ABSORBED BY 1 CU. FT. DRY AIR PER DEG. FAHR.	CUBIC FEET DRY AIR WARMED 1 DEG. PER B.T.U.
-50	0.09690	0.7735	0.02335	42.82
-45	0.09573	0.7829	0.02307	43.34
-40	0.09459	0.7924	0.02280	43.87
-35	0.09348	0.8018	0.02253	44.39
-30	0.09239	0.8112	0.02226	44.91
-25	0.09133	0.8206	0.02201	45.43
-20	0.09029	0.8301	0.02176	45.96
-15	0.08927	0.8396	0.02151	46.48
-10	0.08828	0.8490	0.02127	47.00
-5	0.08731	0.8585	0.02104	47.52
0	0.08636	0.8680	0.02080	48.08
5	0.08544	0.8772	0.02060	48.53
10	0.08453	0.8867	0.02039	49.05
15	0.08363	0.8962	0.02018	49.56
20	0.08276	0.9057	0.01998	50.05
25	0.08190	0.9152	0.01977	50.58
30	0.08107	0.9246	0.01957	51.10
35	0.08025	0.9340	0.01938	51.60
40	0.07945	0.9434	0.01919	52.11
45	0.07866	0.9530	0.01900	52.64
50	0.07788	0.9624	0.01881	53.17
55	0.07713	0.9718	0.01863	53.68
60	0.07640	0.9811	0.01846	54.18
65	0.07567	0.9905	0.01829	54.68
70	0.07495	1.0000	0.01812	55.19
75	0.07424	1.0095	0.01795	55.72
80	0.07356	1.0190	0.01779	56.21
85	0.07289	1.0283	0.01763	56.72
90	0.07222	1.0380	0.01747	57.25
95	0.07157	1.0472	0.01732	57.74
100	0.07093	1.0570	0.01716	58.28
105	0.07030	1.0660	0.01702	58.76
110	0.06968	1.0756	0.01687	59.28
115	0.06908	1.0850	0.01673	59.78
120	0.06848	1.0945	0.01659	60.28
125	0.06790	1.1040	0.01645	60.79
130	0.06732	1.1133	0.01631	61.32
135	0.06675	1.1230	0.01618	61.81
140	0.06620	1.1320	0.01605	62.31
145	0.06565	1.1417	0.01592	62.82
150	0.06510	1.1512	0.01578	63.37
160	0.06406	1.1700	0.01554	64.35
170	0.06304	1.1890	0.01530	65.36
180	0.06205	1.2080	0.01506	66.40
190	0.06110	1.2270	0.01484	67.40
200	0.06018	1.2455	0.01462	68.41
220	0.05840	1.2833	0.01419	70.48
240	0.05673	1.3212	0.01380	72.46
260	0.05516	1.3590	0.01343	74.46
280	0.05367	1.3967	0.01308	76.46
300	0.05225	1.4345	0.01274	78.50
350	0.04903	1.5288	0.01197	83.55
400	0.04618	1.6230	0.01130	88.50
450	0.04364	1.7177	0.01070	93.46
500	0.04138	1.8113	0.01018	98.24
550	0.03932	1.9060	0.00967	103.42
600	0.03746	2.0010	0.00923	108.35
650	0.03423	2.0946	0.00847	118.07
700	0.03151	2.3785	0.00782	127.88
800	0.02920	2.5670	0.00728	137.37
1000	0.02720	2.7560	0.00680	147.07
1200	0.02392	3.1655	0.00603	165.83

^aFrom *Mechanical Equipment of Buildings*, Vol. 1, by Harding and Willard, second edition, 1929.TABLE 8. PROPERTIES OF SATURATED AIR^a
(Standard Atmospheric Pressure of 29.921 in. of Mercury)

TEMPERATURE, DEG. FAHR.	VAPOR PRESSURE, INCHES OF MERCURY	WEIGHT PER CUBIC FOOT OF MIXTURE			BTU ABSORBED BY 1 CU. FT. SATURATED AIR PER DEG. FAHR.	CUBIC FEET SATURATED AIR WARMED 1 DEG. PER BTU.
		Weight of Dry Air, Pound	Weight of Vapor, Pound	Total Weight of Mixture, Pound		
0	0.0383	0.08625	0.000069	0.08632	0.02082	48.04
10	0.0631	0.08433	0.000111	0.08444	0.02039	49.05
20	0.1030	0.08247	0.000177	0.08265	0.01998	50.05
30	0.1640	0.08063	0.000276	0.08091	0.01955	51.15
40	0.2477	0.07880	0.000409	0.07921	0.01921	52.06
50	0.3625	0.07694	0.000587	0.07753	0.01883	53.11
60	0.5220	0.07506	0.000829	0.07589	0.01852	54.00
70	0.7390	0.07310	0.001152	0.07425	0.01811	55.22
80	1.0290	0.07095	0.001576	0.07253	0.01788	55.93
90	1.4170	0.06881	0.002132	0.07094	0.01763	56.72
100	1.9260	0.06637	0.002848	0.06922	0.01737	57.57
110	2.5890	0.06367	0.003763	0.06743	0.01716	58.27
120	3.4380	0.06062	0.004914	0.06553	0.01696	58.96
130	4.5200	0.05716	0.006357	0.06352	0.01681	59.50
140	5.8800	0.05319	0.008140	0.06133	0.01669	59.92
150	7.5700	0.04864	0.010310	0.05894	0.01663	60.14
160	9.6500	0.04341	0.012956	0.05637	0.01664	60.10
170	12.2000	0.03735	0.016140	0.05349	0.01671	59.85
180	15.2900	0.03035	0.019940	0.05029	0.01682	59.45
190	19.0200	0.02227	0.024465	0.04674	0.01706	58.80
200	23.4700	0.01297	0.029780	0.04275	0.01750	57.15

^aFrom *Fan Engineering*.TABLE 9. SPECIFIC HEAT OF VARIOUS SOLIDS AND LIQUIDS
BETWEEN 32 AND 212 DEG. FAHR.^a

SOLIDS	SOLIDS	SOLIDS
Alloys:	Glass:	
Bismuth-tin..... 0.040-0.045	Normal..... 0.199	Tufa..... 0.33
Bell metal..... 0.086	Crown..... 0.16	Vulcanite..... 0.331
Brass, yellow..... 0.0883	Flint..... 0.12	Wood:
Brass, red..... 0.090	Gneiss..... 0.18	Fir..... 0.65
Bronze..... 0.104	Granite..... 0.195	Oak..... 0.57
Constantan..... 0.098	Graphite..... 0.201	Pine..... 0.67
D'Arco's metal..... 0.050	Gypsum..... 0.259	
German silver..... 0.095	Hornblende..... 0.195	LIQUIDS
Lipowitz's metal..... 0.040	Humus (soil)..... 0.44	Acetic acid..... 0.51
Nickel steel..... 0.109	Ice..... 0.504	Alcohol (absolute)..... 0.58
Rose's metal..... 0.050	India rubber (Para)..... 0.27-0.48	Aniline..... 0.49
Solders (Pb and Sn)..... 0.040-0.045	Kaolin..... 0.224	Benzol..... 0.40
Type metal..... 0.0388	Limestone..... 0.217	Chloroform..... 0.23
Wood's metal..... 0.040	Marble..... 0.210	Ether..... 0.54
40 Pb + 60 Bi..... 0.0317	Oxides:	Fusel oil..... 0.56
25 Pb + 75 Bi..... 0.030	Alumina (Al ₂ O ₃)..... 0.183	Gasoline..... 0.50
Asbestos..... 0.20	Cu ₂ O..... 0.111	Glycerine..... 0.576
Ashes..... 0.20	Lead oxide (PbO)..... 0.051	Hydrochloric acid..... 0.60
Basalt (lava)..... 0.20	Limestone..... 0.156	Kerosene..... 0.50
Borax..... 0.229	Magnesia..... 0.222	Naphthalene..... 0.31
Brick..... 0.22	Magnetite (Fe ₃ O ₄)..... 0.168	Machine oil..... 0.40
Carbon-coke..... 0.203	Silica..... 0.191	Mercury..... 0.033
Chalk..... 0.215	Soda..... 0.231	Olive oil..... 0.40
Charcoal..... 0.20	Zinc oxide (ZnO)..... 0.125	Paraffin oil..... 0.52
Cinders..... 0.18	Paraffin wax..... 0.69	Petroleum..... 0.498
Coal..... 0.314	Porcelain..... 0.20	Sulphuric acid..... 0.336
Concrete..... 0.156	Quartz..... 0.17-0.28	Sea water..... 0.94
Cork..... 0.485	Quicklime..... 0.217	Toluene..... 0.40
Corundum..... 0.198	Salt, rock..... 0.21	Turpentine..... 0.42
Dolomite..... 0.222	Sand..... 0.195	Molten metals:
Ebonite..... 0.33	Sandstone..... 0.22	Bismuth (535-725 F)..... 0.036
	Serpentine..... 0.25	Lead (590-680 F)..... 0.041
	Sulphur..... 0.180	Sulphur (246-297 F)..... 0.235
	Talc..... 0.209	Tin (460-660 F)..... 0.058

^aFrom Marks' *Mechanical Engineers' Handbook*.