TABLE 5. CIRCUMFERENCES AND AREAS OF CIRCLES

DIAMETER IN INCHES	AREA		CIRCUMFERENCE		DIAMETER IN INCHES	AREA		CIRCUMFERENCE	
	Sq. In.	Sq. Ft.	Inches	Feet		Sq. In.	Sq. Ft.	Inches	Feet
¼	0.049	0.0003	0.785	0.0652	28	615.8	4.276	87.97	7.330
½	0.196	0.0014	1.571	0.1309	28½	637.9	4.430	89.54	7.462
¾	0.442	0.0031	2.356	0.1964	29	660.52	4.587	91.11	7.592
1	0.785	0.0054	3.142	0.2618	29½	683.5	4.747	92.63	7.725
1¼	1.227	0.0085	3.927	0.3273	30	706.8	4.909	94.25	7.854
1½	1.767	0.0123	4.712	0.3927	31	754.8	5.241	97.39	8.116
1¾	2.405	0.0167	5.498	0.4582	32	804.3	5.585	100.5	8.378
2	3.142	0.0218	6.283	0.5236	33	855.3	5.940	103.7	8.639
2¼	3.976	0.0276	7.069	0.5891	34	907.9	6.305	106.8	8.901
2½	4.909	0.0341	7.854	0.6546	35	962.1	6.681	109.9	9.163
2¾	5.939	0.0412	8.639	0.7200	36	1018.0	7.069	113.1	9.425
3	7.069	0.0491	9.425	0.7854	37	1075.0	7.467	116.2	9.686
3¼	8.296	0.0576	10.21	0.8510	38	1134.0	7.876	119.4	9.948
3½	9.621	0.0668	10.99	0.9160	39	1195.0	8.296	122.5	10.21
3¾	11.04	0.0767	11.78	0.9818	40	1256.0	8.727	125.6	10.47
4	12.57	0.0873	12.57	1.047	41	1320.0	9.168	128.8	10.73
4¼	14.19	0.0986	13.35	1.113	42	1385.0	9.621	131.9	10.99
4½	15.90	0.1104	14.14	1.178	43	1452.0	10.08	135.1	11.26
4¾	17.72	0.1231	14.92	1.243	44	1521.0	10.56	138.2	11.52
5	19.64	0.1364	15.71	1.309	45	1590.0	11.04	141.4	11.78
5¼	21.65	0.1504	16.49	1.374	46	1662.0	11.54	144.5	12.04
5½	23.76	0.1650	17.28	1.440	47	1735.0	12.05	147.7	12.30
5¾	25.97	0.1840	18.06	1.505	48	1810.0	12.51	150.8	12.57
6	28.27	0.1964	18.85	1.571	49	1886.0	13.09	153.9	12.83
6¼	30.68	0.2131	19.64	1.637	50	1963.0	13.64	157.1	13.09
6½	33.18	0.2304	20.42	1.702	51	2043.0	14.19	160.2	13.35
6¾	35.79	0.2486	21.21	1.768	52	2124.0	14.75	163.4	13.61
7	38.49	0.2673	21.99	1.833	53	2206.0	15.32	166.5	13.88
7¼	41.28	0.2867	22.78	1.899	54	2290.0	15.90	169.6	14.14
7½	44.18	0.3068	23.56	1.964	55	2376.0	16.50	172.8	14.40
7¾	47.17	0.3276	24.35	2.029	56	2463.0	17.10	175.9	14.66
8	50.27	0.3491	25.13	2.094	57	2552.0	17.72	179.1	14.92
8¼	53.46	0.3713	25.92	2.160	58	2642.0	18.35	182.2	15.18
8½	56.75	0.3942	26.70	2.225	59	2734.0	18.99	185.4	15.45
8¾	60.13	0.4175	27.49	2.291	60	2827.0	19.63	188.5	15.71
9	63.62	0.4418	28.27	2.356	61	2922.0	20.29	191.6	15.97
9¼	67.20	0.4668	29.06	2.422	62	3019.0	20.97	194.8	16.23
9½	70.88	0.4923	29.85	2.488	63	3117.0	21.65	197.9	16.49
9¾	74.66	0.5185	30.63	2.553	64	3217.0	22.34	201.1	16.76
10	78.54	0.5454	31.42	2.618	65	3318.0	23.04	204.2	17.02
10½	86.59	0.6010	32.99	2.750	66	3421.0	23.76	207.3	17.28
11	95.03	0.6600	34.56	2.880	67	3526.0	24.48	210.5	17.54
11½	103.9	0.7215	36.13	3.011	68	3632.0	25.22	213.6	17.80
12	113.1	0.7854	37.70	3.142	69	3739.0	25.97	216.8	18.06
12½	122.7	0.8520	39.27	3.273	70	3848.0	26.73	219.9	18.33
13	132.7	0.9218	40.84	3.403	71	3959.0	27.49	223.1	18.59
13½	143.1	0.9937	42.41	3.535	72	4072.0	28.27	226.2	18.85
14	153.9	1.069	43.98	3.665	73	4185.0	29.07	229.3	19.11
14½	165.1	1.146	45.55	3.796	74	4301.0	29.87	232.5	19.37
15	176.7	1.227	47.12	3.927	75	4418.0	30.68	235.6	19.63
15½	188.7	1.310	48.69	4.058	76	4536.0	31.50	238.8	19.90
16	201.1	1.396	50.27	4.189	77	4657.0	32.34	241.9	20.16
16½	213.8	1.485	51.84	4.321	78	4778.0	33.18	245.0	20.42
17	226.9	1.576	53.41	4.451	79	4902.0	34.04	248.2	20.68
17½	240.5	1.670	54.98	4.582	80	5027.0	34.91	251.3	20.94
18	254.5	1.767	56.55	4.712	81	5153.0	35.78	254.5	21.21
18½	268.8	1.867	58.12	4.845	82	5281.0	36.67	257.6	21.47
19	283.5	1.969	59.69	4.974	83	5411.0	37.57	260.8	21.73
19½	298.6	2.074	61.26	5.105	84	5542.0	38.48	263.9	21.99
20	314.2	2.182	62.83	5.236	85	5675.0	39.41	267.0	22.25
20½	330.1	2.293	64.40	5.367	86	5809.0	40.34	270.2	22.51
21	346.4	2.405	65.97	5.498	87	5945.0	41.28	273.3	22.78
21½	361.1	2.508	67.54	5.629	88	6082.0	42.24	276.5	23.04
22	380.1	2.640	69.12	5.760	89	6221.0	43.20	279.6	23.30
22½	397.6	2.761	70.69	5.891	90	6362.0	44.18	282.7	23.56
23	415.5	2.885	72.26	6.021	91	6504.0	45.17	285.9	23.82
23½	433.7	3.012	73.83	6.153	92	6648.0	46.16	289.0	24.09
24	452.4	3.142	75.40	6.283	93	6793.0	47.17	292.2	24.35
24½	471.4	3.274	76.97	6.415	94	6940.0	48.19	295.3	24.61
25	490.9	3.409	78.54	6.545	95	7088.0	49.22	298.4	24.87
25½	510.7	3.547	80.11	6.676	96	7238.0	50.27	301.6	25.13
26	530.9	3.687	81.68	6.807	97	7390.0	51.32	304.7	25.39
26½	551.6	3.832	83.25	6.938	98	7543.0	52.38	307.9	25.66
27	572.6	3.976	84.82	7.069	99	7698.0	53.46	311.0	25.92
27½	593.9	4.125	86.39	7.199	100	7854.0	54.54	314.2	26.18

TABLE 6. 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			B.T.U. ABSORBED BY 1 CU. FT. SATURATED AIR PER DEG. FAHR.	CUBIC FEET SATURATED AIR WARMED 1 DEG. PER B.T.U.
		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

[a]From *Fan Engineering*, published by The Buffalo Forge Company.

TABLE 7. PROPERTIES OF GASES[a]

GAS	CHEMICAL SYMBOL	NUMBER OF ATOMS	MOLECULAR WEIGHT		WEIGHT IN POUND OF 1 CU. FT. AT ATMOSPHERIC PRESSURE		DENSITY RELATIVE TO AIR	GAS CONSTANT, R	SPECIFIC HEAT PER POUND		SPECIFIC HEAT PER CUBIC FOOT AT ATMOSPHERIC PRESSURE AND 62 DEG. FAHR.		$k = \frac{c_p}{c_v}$
			Approximate	Exact $O_2=32$	At 62 deg. fahr.	At 32 deg. fahr.			c_p	c_v	c_p	c_v	
Helium	He	1	4.0	4.0	0.0105	0.0112	0.137	386.0	1.25	0.75	0.0131	0.0079	1.66
Argon	Ar	1	40.0	39.9	0.1048	0.1112	1.378	38.70	0.124	0.075	0.0131	0.0079	1.66
Air			29.0	28.95	0.0761	0.0807	1	53.34	0.241	0.171	0.0183	0.0130	1.40
Oxygen	O_2	2	32.0	32	0.0840	0.0892	1.105	48.25	0.217	0.155	0.0182	0.0130	1.40
Nitrogen	N_2	2	28.0	28.08	0.0737	0.0783	0.970	54.99	0.247	0.176	0.0182	0.0130	1.40
Hydrogen	H_2	2	2.0	2.016	0.00529	0.00562	0.0696	765.86	3.42	2.44	0.0181	0.0129	1.40
Nitric oxide	NO	2	30.0	30.04	0.0789	0.0838	1.038	51.40	0.231	0.165	0.0183	0.0130	1.40
Carbon monoxide	CO	2	28.0	28.00	0.0734	0.0780	0.968	55.14	0.243	0.172	0.0180	0.0126	1.41
Hydrochloric acid	HCl	2	36.5	36.45	0.0958	0.1017	1.260	42.35	0.191	0.136	0.0183	0.0130	1.40
Carbon dioxide	CO_2	3	44.0	44.00	0.1156	0.1227	1.520	35.09	0.210	0.160	0.0243	0.0185	1.31
Nitrous oxide	N_2O	3	44.0	44.08	0.1157	0.1229	1.522	35.03	0.221	0.171	0.0256	0.0198	1.26
Sulphur dioxide	SO_2	3	64.0	64.06	0.1684	0.1786	2.213	24.10	0.154	0.123	0.0260	0.0207	1.25
Ammonia	NH_3	4	17.0	17.06	0.04483	0.0476	0.590	90.50	0.523	0.399	0.0234	0.0178	1.31
Acetylene	C_2H_2	4	26.0	26.02	0.0684	0.0725	0.899	59.34	0.350	0.270	0.024	0.0185	1.28
Methyl chloride	CH_3Cl	5	50.5	50.47	0.1326	0.1407	1.744	30.59	0.24	0.20	0.032	0.0265	1.20
Methane	CH_4	5	16.0	16.03	0.0421	0.0447	0.554	96.31	0.593	0.450	0.025	0.019	1.32
Ethylene	C_2H_4	6	28.0	28.03	0.0738	0.0780	0.969	55.08	0.40	0.33	0.029	0.024	1.20

[a]From Marks' *Mechanical Engineers' Handbook*.