

Chimneys recommended for larger boilers 15 to 250 hp. are proportioned in accordance with the report made by a joint Committee of the *American Boiler Manufacturers Association* and *Stoker Manufacturers Association* and approved by these organizations. The sizes are given in Table 2.

TABLE 2. HEIGHT OF STACK FOR AVERAGE INSTALLATIONS (Sea Level)

<i>Forced Draft Stokers</i>					
Per Cent Rating.....	100	150	200	250	300
Draft Furnace.....	0.15	0.15	0.15	0.15	0.15
Friction Loss (Boiler).....	0.18	0.4	0.65	0.9	1.20
Friction Loss (Breeching).....	0.10	0.10	0.10	0.10	0.10
Total Draft Required.....	0.43	0.65	0.90	1.15	1.45
Height of Stack (Ft.).....	80	112	145	178	220

DIAMETER OF CHIMNEY IN INCHES FOR HORIZONTAL RETURN TUBULAR BOILERS				HEIGHT OF STACK IN FEET—FOR SEA LEVEL AND 60 DEG. FAHR. OUTSIDE TEMP. ASSUMED FRICTION LOSS IN STACK 0.1 IN. PER 100 FT.			
Nominal H. P.	100% Rating	150% Rating	200% Rating	Draft at Base of Stack	100% Rating	150% Rating	200% Rating
15	13	14	17	0.12	21	22	25
20	14	16	18	0.15	26	28	30
25	16	18	20	0.20	35	37	41
30	17	19	21	0.25	43	46	51
35	18	20	22	0.30	52	56	61
40	19	21	23	0.35	60	65	71
50	20	23	25	0.40	69	74	81
60	21	24	27	0.45	78	84	91
75	23	26	29	0.50	86	93	101
90	25	28	31	0.55	95	102	111
100	26	29	33	0.60	104	112	122
115	27	31	34	0.65	112	121	132
125	28	32	35	.....	.....	.....	.....
150	30	34	38	.....	.....	.....	.....
175	32	36	40	.....	.....	.....	.....
200	33	38	43	.....	.....	.....	.....
210	34	38	44	.....	.....	.....	.....
225	35	40	45	.....	.....	.....	.....
250	36	41	47	.....	.....	.....	.....

DATA ON WHICH TABLES ARE BASED

Rating.....	100%	150%	200%	Stack Temp.			
Efficiency.....	65%	65%	63%	deg. fahr.....	450	500	550
CO ₂	8%	9%	10%	Lbs. of Gas.....	85	77	73

AVERAGE FRICTION LOSS THROUGH BOILERS

Per Cent Rating.....	100	150	200	250	300
Loss Ins., Water.....	0.1 to 0.3	0.2 to 0.6	0.3 to 0.9	0.5 to 1.4	0.7 to 1.9

Friction loss through boiler varies according to construction.
For Furnace Draft.—Allow 0.15 for forced draft. *For Natural Draft* 0.35 in. or higher should be used depending upon rate of combustion and fuel used.
For Breeching Friction Loss.—Allow 0.05 in. for each right angle bend and 0.1 in. per 100 ft. of length. Cross sectional area should be 20 per cent larger than that of stack.

HEIGHT OF STACK IN FEET

For Sea Level and 60 deg. fahr. Outside Temperature and 0.1 in. Friction Loss per 100 ft.

TOTAL DRAFT REQUIRED IN. FOR FURNACE •BOILER AND BREECHING	PER. CENT OF BOILER RATING				
	100	150	200	250	300
0.3	56	.....	.....	.....	.....
0.4	74	69	.....	.....	.....
0.5	93	86	81	.....	.....
0.6	111	103	97	.....	.....
0.7	130	120	113	108	.....
0.8	148	138	129	123	.....
0.9	.....	155	145	139	132
1.0	.....	172	161	154	147
1.1	.....	190	177	170	162
1.2	.....	.....	194	185	176
1.3	.....	.....	209	200	191
1.4	.....	.....	226	216	206
1.5	.....	.....	.....	231	221
1.6	.....	.....	.....	.....	236
1.8	.....	.....	.....	.....	265
Assumed Flue Gas Temp.....	500	550	600	650	700

CORRECTION FOR ALTITUDE

HEIGHT ABOVE SEA LEVEL (FT.)	RATIO INCREASE IN DIAMETER	RATIO INCREASE IN HEIGHT
0	1.000	1.000
1,000	1.015	1.046
2,000	1.030	1.097
4,000	1.063	1.205
6,000	1.096	1.321
8,000	1.130	1.456
10,000	1.165	1.612

The principal factors which affect the loss of draft through the fuel bed according to J. G. Mingle,¹ are:

1. Character of fuel burned,
2. Amount of fuel burned per square foot of grate surface per hour, or the rate of combustion.

The loss of draft through the boiler is affected mainly by:

1. Type and size of boiler,
2. Rate of operation.

The required height of a chimney is affected by the following:

1. Character of fuel burned,
2. Rate of combustion,

¹Draft and Capacity of Chimneys.