

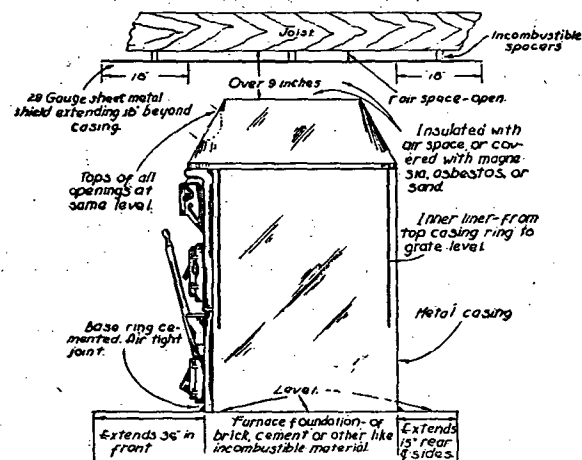


FIG. 3. DETAILS OF FURNACE BONNET, CASING, AND FOUNDATION
(FROM NWAH & ACA MANUAL 5, FIFTH EDITION)

TABLE 5. RESISTANCES OF WARM AIR BOOT COMBINATIONS EXPRESSED IN ELBOW EQUIVALENTS

WARM AIR BOOT	NAME OF COMBINATION	EQUIVALENT No. OF 90-Deg ELBOWS
A	45-Deg Angle Boot and 45-Deg Elbow	1
B	90-Deg Angle Boot	1
C	Universal Boot and 90-Deg Elbow	1
D	End Boot	2
E	Offset Boot	2½
F	45-Deg Angle	½
G	Floor Register—Second Story	2
H	Offset	3
I	Offset	2
J	Round Side Take-Off	1
K	Offset Starting Collar	1
L	Straight Starting Collar	3

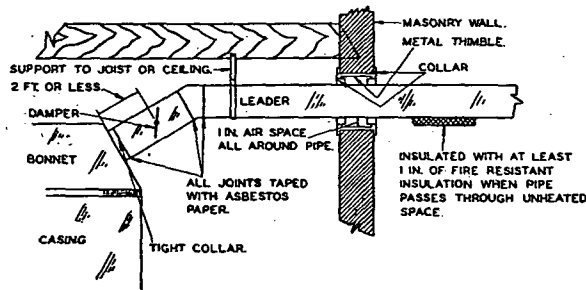


FIG. 4. DETAILS OF BONNET AND LEADER OF GRAVITY WARM-AIR FURNACE
(FROM NWAH & ACA MANUAL 5, FIFTH EDITION)

TABLE 6. WARM AIR CARRYING CAPACITY, BTUH DELIVERED, FIRST STORY REGISTERS

COMBINATION No.	No. OF ELBOWS	Height from basement floor to bottom of joists—Feet→	ACTUAL LENGTH (BONNET TO BOOT) FEET												
			6							4	6	8	10		
			6½							4	6	8	10	12	14
			7							4	6	8	10	12	14
			7½	4	6	8	10	12	14	16	18	20	22		
1	1	Height from basement floor to bottom of joists—Feet→	6,020	5,850	5,680	5,510	5,340	5,170	5,000	4,830	4,660	4,490			
2			7,620	7,400	7,180	6,970	6,760	6,540	6,320	6,110	5,890	5,680			
3			9,400	9,140	8,870	8,600	8,340	8,070	7,810	7,540	7,270	7,010			
4			13,350	12,970	12,590	12,210	11,830	11,450	11,080	10,700	10,320	9,950			
1	2		5,850	5,660	5,490	5,330	5,160	5,000	4,840	4,670	4,510	4,340			
2			7,360	7,150	6,940	6,730	6,520	6,320	6,110	5,910	5,700	5,500			
3			9,090	8,840	8,580	8,320	8,060	7,800	7,550	7,290	7,040	6,780			
4			12,910	12,540	12,170	11,800	11,430	11,060	10,690	10,320	9,950	9,580			
1	3		5,620	5,460	5,310	5,150	4,990	4,830	4,670	4,510	4,350	4,190			
2			7,120	6,910	6,710	6,510	6,310	6,110	5,900	5,700	5,500	5,300			
3			8,780	8,530	8,280	8,030	7,780	7,530	7,290	7,040	6,800	6,550			
4			12,450	12,100	11,750	11,400	11,050	10,700	10,350	10,000	9,650	9,300			
1	4		5,420	5,260	5,110	4,960	4,800	4,650	4,500	4,350	4,190	4,040			
2			6,860	6,660	6,460	6,270	6,080	5,890	5,690	5,500	5,300	5,110			
3			8,460	8,220	7,980	7,740	7,500	7,260	7,020	6,780	6,550	6,310			
4			12,010	11,670	11,330	10,990	10,650	10,310	9,970	9,630	9,290	8,950			
1	5		5,240	5,090	4,940	4,790	4,640	4,500	4,350	4,200	4,050	3,910			
2			6,630	6,440	6,250	6,060	5,880	5,690	5,500	5,320	5,130	4,940			
3			8,180	7,950	7,720	7,490	7,260	7,030	6,800	6,560	6,330	6,100			
4			11,610	11,290	10,950	10,620	10,300	9,970	9,640	9,320	8,990	8,660			

Notes: Carrying capacity and length of run increased with basement depth.
Length of trunk and carrying capacity of gravity extended plenum installations should be based on the 6 ft basement depth capacities.

pressed in equivalent elbows are shown in Table 5. It is essential that free areas be maintained throughout fittings.

Figs. 3 and 4 show recommended practice as given in Manual 5 of the *National Warm Air Heating and Air Conditioning Association*. For construction, design features, and ratings of gravity furnaces see Chapter 16.

Carrying Capacity

The Btu per hour carrying capacities of the selected warm air and return air combinations are shown in Tables 6, 7 and 8.

The selected types of return air ducts and fittings are shown in Fig. 5.

Design Procedure

The steps to be taken in designing a gravity warm air duct system are:

1. Calculate the heat loss from each room as explained in Chapters 9, 11 and 12.
2. Prepare a layout showing (a) furnace, (b) chimney connection, (c) warm air registers (whether floor, baseboard or wall), (d) return air grilles.
3. Indicate on each warm air leader (using symbols shown in Fig. 6): (a) whether the room to be heated is on first or second story; (b) the approximate length of leader pipe in the basement; (c) the number of right angle elbows and equivalent elbows (Table 5) required, including the elbow at the boot connection (see Fig. 2); (d) whether the register is to be located in the floor, in the baseboard, or in the wall.