TABLE 8. RETURN PIPE CAPACITIES

Capacity Expressed in Square Feet of Equivalent Direct Radiation

(Reference to this table will be by column letter *M* through *EE*)

This table is based on pipe size data developed through the research investigations of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.

CAPACITY OF RETURN MAINS AND RISERS

Pipe Size Inches	Mains																											
	1/32 Lb or 1/16 Oz Drop per 100 Ft			1/24 Lb or 1/32 Oz Drop per 100 Ft			1/16 Lb or 1/8 Oz Drop per 100 Ft			1/8 Lb or 2 Oz Drop per 100 Ft			1/4 Lb or 4 Oz Drop per 100 Ft			1/2 Lb or 8 Oz Drop per 100 Ft		
	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.
M	*N*	*O*	*P*	*Q*	*R*	*S*	*T*	*U*	*V*	*W*	*X*	*Y*	*Z*	*AA*	*BB*	*CC*	*DD*	*EE*
¾	.....	.....	.....	.....	.....	326	.....	.....	400	.....	.....	568	.....	.....	800	.....	.....	1,130
1	500	248	.....	580	285	570	700	320	700	1,000	412	994	1,400	460	1,400	.....	.....	1,977
1¼	850	520	.....	990	595	976	1,200	670	1,200	1,700	868	1,704	2,400	962	2,400	.....	.....	3,390
1½	1,350	822	.....	1,570	943	1,547	1,900	1,058	1,900	2,700	1,362	2,696	3,800	1,512	3,800	.....	.....	5,370
2	2,800	1,880	.....	3,240	2,140	3,256	4,000	2,300	4,000	5,600	2,960	5,680	8,000	3,300	8,000	.....	.....	11,300
2½	4,700	3,040	.....	5,300	3,470	5,453	6,700	3,800	6,700	9,400	4,900	9,510	13,400	5,450	13,400	.....	.....	18,925
3	7,500	5,840	.....	8,500	6,250	8,710	10,700	7,000	10,700	15,000	9,000	15,190	21,400	10,000	21,400	.....	.....	30,230
3½	11,000	7,880	.....	13,200	8,800	13,020	16,000	10,000	16,000	22,000	12,900	22,710	32,000	14,300	32,000	.....	.....	45,200
4	15,500	11,700	.....	18,300	13,400	17,910	22,000	15,000	22,000	31,000	19,300	31,220	44,000	21,500	44,000	.....	.....	62,180
5	.....	.....	.....	.....	.....	31,500	.....	.....	38,700	.....	.....	54,920	.....	.....	77,400	.....	.....	109,300
6	.....	.....	.....	.....	.....	50,450	.....	.....	62,000	.....	.....	88,000	.....	.....	124,000	.....	.....	175,100

Pipe Size Inches	Risers																											
	1/32 Lb or 1/16 Oz Drop per 100 Ft			1/24 Lb or 1/32 Oz Drop per 100 Ft			1/16 Lb or 1/8 Oz Drop per 100 Ft			1/8 Lb or 2 Oz Drop per 100 Ft			1/4 Lb or 4 Oz Drop per 100 Ft			1/2 Lb or 8 Oz Drop per 100 Ft		
	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.	Wet	Dry	Vac.
M	*N*	*O*	*P*	*Q*	*R*	*S*	*T*	*U*	*V*	*W*	*X*	*Y*	*Z*	*AA*	*BB*	*CC*	*DD*	*EE*
¾	.....	.....	.....	.....	.....	570	.....	.....	700	.....	.....	994	.....	.....	1,400	.....	.....	1,977
1	.....	190	.....	.....	190	976	.....	190	1,200	.....	190	1,704	.....	190	2,400	.....	.....	3,390
1¼	.....	450	.....	.....	450	1,547	.....	450	1,900	.....	450	2,696	.....	450	3,800	.....	.....	5,370
1½	.....	990	.....	.....	990	3,256	.....	990	4,000	.....	990	5,680	.....	990	8,000	.....	.....	11,300
2	.....	1,500	.....	.....	1,500	5,453	.....	1,500	6,700	.....	1,500	9,510	.....	1,500	13,400	.....	.....	18,925
2½	.....	3,000	.....	.....	3,000	8,710	.....	3,000	10,700	.....	3,000	15,910	.....	3,000	21,400	.....	.....	30,230
3	.....	.....	.....	.....	.....	13,020	.....	.....	16,000	.....	.....	22,710	.....	.....	32,000	.....	.....	45,200
3½	.....	.....	.....	.....	.....	17,910	.....	.....	22,000	.....	.....	31,220	.....	.....	44,000	.....	.....	62,180
4	.....	.....	.....	.....	.....	31,500	.....	.....	38,700	.....	.....	54,920	.....	.....	77,400	.....	.....	109,300
5	.....	.....	.....	.....	.....	50,450	.....	.....	62,000	.....	.....	88,000	.....	.....	124,000	.....	.....	175,100

Example 2. What pressure drop should be used for the steam piping of a system if the measured length of the longest run is 500 ft and the initial pressure is not to be over 2-lb gage?

Solution. It will be assumed, if the measured length of the longest run is 500 ft, that when the allowance for fittings is added the equivalent length of run will not exceed 1,000 ft. Then, with the pressure drop not over one half of the initial pressure, the drop could be 1 lb or less. With a pressure drop of 1 lb and a length of run of 1,000 ft, the drop per 100 ft would be $\frac{1}{10}$ lb, while if the total drop were $\frac{1}{2}$ lb, the drop per 100 ft would be $\frac{1}{20}$ lb. In the first instance the pipe could be sized according to Column *D* for $\frac{1}{16}$ lb per 100 ft, and in the second case, the pipe could be sized according to Column *C* for $\frac{1}{24}$ lb. On completion of the sizing, the drop could be checked by taking the longest line and actually calculating the equivalent length of run from the pipe sizes determined. If the calculated drop is less than that assumed, the pipe size is all right; if it is more, it is probable that there are an unusual number of fittings involved, and either the lines must be straightened or the column for the next lower drop must be used and the lines resized. Ordinarily resizing will be unnecessary.

ONE-PIPE GRAVITY AIR-VENT SYSTEMS

One-pipe gravity air-vent systems in which the equivalent length of run does not exceed 200 ft should be sized as follows:

1. *For the steam main and dripped runouts to risers* where the steam and condensate flow in the same direction, use $\frac{1}{16}$-lb drop (Column *D*).

2. *Where the riser runouts are not dripped* and the steam and condensation flow in opposite directions, and *also in the radiator runouts* where the same condition occurs, use Column *L*.

3. *For up-feed steam risers* carrying condensation back from the radiators, use Column *J*.

4. *For down-feed systems the main risers* of which do not carry any radiator condensation, use Column *H*.

5. *For the radiator valve size and the stub connection*, use Column *K*.

6. For the *dry return main*, use Column *U*.

7. For the *wet return main* use Column *T*.

On systems exceeding an equivalent length of 200 ft, it is suggested that the total drop be not over $\frac{1}{4}$ lb. The return piping sizes should correspond with the drop used on the steam side of the system. Thus, where $\frac{1}{24}$-lb drop is being used, the steam main and dripped runouts would be sized from Column *C;* radiator runouts and undripped riser runouts from Column *L;* up-feed risers from Column *J*; the main riser on a down-feed system from Column *C* (it will be noted that if Column *H* is used the drop would exceed the limit of $\frac{1}{24}$ lb); the dry return from Column *R;* and the wet return from Column *Q*.

With a $\frac{1}{32}$-lb drop the sizing would be the same as for $\frac{1}{24}$ lb except that the steam main and dripped runouts would be sized from Column *B*, the main riser on a down-feed system from Column *B*, the dry return from Column *O*, and the wet return from Column *N*.

Example 3. Size the one-pipe gravity steam system shown in Fig. 1 assuming that this is all there is to the system or that the riser and run shown involve the longest run on the system.

Solution. The total length of run actually shown is 215 ft. If the equivalent length of run is taken at double this, it will amount to 430 ft, and with a total drop of $\frac{1}{4}$ lb the drop per 100 ft will be slightly less than $\frac{1}{16}$ lb. It would be well in this case to use $\frac{1}{24}$ lb, and this would result in the theoretical sizes indicated in Table 9. These theo-