

TABLE 9. 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									
	$\frac{1}{32}$ Lb or $\frac{1}{4}$ Os Drop per 100 Ft		$\frac{1}{16}$ Lb or $\frac{1}{2}$ Os Drop per 100 Ft		$\frac{1}{8}$ Lb or 1 Os Drop per 100 Ft		$\frac{1}{4}$ Lb or 2 Os Drop per 100 Ft		$\frac{1}{2}$ Lb or 4 Os Drop per 100 Ft	
	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
M	N	O	P	Q	R	S	T	U	V	W
$\frac{3}{4}$	500	248	.....	580	285	326	700	320	400	1,000
1	850	520	.....	990	595	570	1,200	670	700	1,700
$1\frac{1}{4}$	1,350	822	.....	1,570	943	1,547	1,900	1,058	1,200	2,700
$1\frac{1}{2}$	2,800	1,880	.....	3,240	2,140	3,256	4,000	2,300	4,000	5,600
$2\frac{1}{2}$	4,700	3,040	.....	5,300	3,470	5,453	6,700	3,800	6,700	9,400
3	7,500	5,840	.....	8,500	6,250	8,710	10,700	7,000	10,700	15,000
$3\frac{1}{2}$	11,000	7,880	.....	13,200	8,800	13,020	16,000	10,000	16,000	22,000
4	15,500	11,700	.....	18,300	13,400	17,910	22,000	15,000	22,000	31,000
5	.....	.....	.....	.....	.....	31,500	.....	.....	38,700	.....
6	.....	.....	.....	.....	.....	50,450	.....	.....	62,000	.....
$\frac{3}{4}$	190	.....	.....	190	570	.....	700	190	700	1,900
1	450	.....	.....	450	976	.....	1,200	450	1,200	3,000
$1\frac{1}{4}$	990	.....	.....	990	1,547	.....	1,900	990	1,900	5,000
$1\frac{1}{2}$	1,500	.....	.....	1,500	2,256	.....	2,700	1,500	2,700	7,000
$2\frac{1}{2}$	3,000	.....	.....	3,000	5,453	.....	6,700	3,000	6,700	15,000
3	.....	.....	.....	.....	8,710	.....	10,700	.....	10,700	22,000
$3\frac{1}{2}$	.....	.....	.....	.....	13,020	.....	16,000	.....	16,000	31,000
4	.....	.....	.....	.....	17,910	.....	22,000	.....	22,000	38,700
5	.....	.....	.....	.....	31,500	.....	38,700	.....	38,700	62,000
6	.....	.....	.....	.....	50,450	.....	62,000	.....	62,000	88,000
$\frac{3}{4}$	190	.....	.....	190	570	.....	700	190	700	1,900
1	450	.....	.....	450	976	.....	1,200	450	1,200	3,000
$1\frac{1}{4}$	990	.....	.....	990	1,547	.....	1,900	990	1,900	5,000
$1\frac{1}{2}$	1,500	.....	.....	1,500	2,256	.....	2,700	1,500	2,700	7,000
$2\frac{1}{2}$	3,000	.....	.....	3,000	5,453	.....	6,700	3,000	6,700	15,000
3	.....	.....	.....	.....	8,710	.....	10,700	.....	10,700	22,000
$3\frac{1}{2}$	.....	.....	.....	.....	13,020	.....	16,000	.....	16,000	31,000
4	.....	.....	.....	.....	17,910	.....	22,000	.....	22,000	38,700
5	.....	.....	.....	.....	31,500	.....	38,700	.....	38,700	62,000
6	.....	.....	.....	.....	50,450	.....	62,000	.....	62,000	88,000

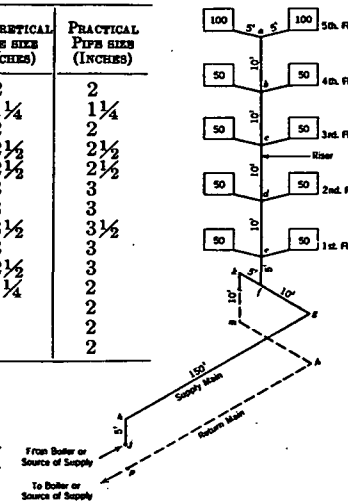
Column C; radiator runouts and undrilled riser runouts from Column L; up-feed risers from Column J; the main riser on a down-feed system from Column C (it will be noted that if Column H is used the drop would exceed the limit of $\frac{1}{4}$ lb); the dry return from Column R; and the wet return from Column Q.

With a $\frac{1}{2}$ -lb drop the sizing would be the same as for $\frac{1}{4}$ 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.

TABLE 10. PIPE SIZES FOR ONE-PIPE UP-FEED SYSTEM SHOWN IN FIG. 2

PART OF SYSTEM	SECTION OF PIPE	RADIATION SUPPLIED (Sq Ft)	THEORETICAL PIPE SIZE (INCHES)	PRACTICAL PIPE SIZE (INCHES)
Branches to radiators..	.....	100	2	2
Branches to radiators..	.....	50	$1\frac{1}{4}$	$1\frac{1}{4}$
Riser.....	a to b	200	2	2
Riser.....	b to c	300	$2\frac{1}{2}$	$2\frac{1}{2}$
Riser.....	c to d	400	$2\frac{1}{2}$	$2\frac{1}{2}$
Riser.....	d to e	500	3	3
Riser.....	e to f	600	3	3
Branch to riser.....	f to g	600	$3\frac{1}{2}$	$3\frac{1}{2}$
Supply main.....	g to h	600	3	3
Branch to supply main.....	h to j	600	$2\frac{1}{2}$	3
Dry return main.....	f to k	600	$1\frac{1}{4}$	2
Wet return main.....	k to m	600	1	2
Wet return main.....	m to n	600	1	2
Wet return main.....	n to p	600	1	2

FIG. 2. RISER, SUPPLY MAIN AND RETURN MAIN OF ONE-PIPE SYSTEM



Example 3. Size the one-pipe gravity steam system shown in Fig. 2 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 $\frac{1}{4}$ lb. It would be well in this case to use $\frac{1}{4}$ lb, and this would result in the theoretical sizes indicated in Table 10. These theoretical sizes, however, should be modified by not using a wet return less than 2 in. while the main supply, g-h, if from the uptake of a boiler, should be made the full size of the main, or 3 in. Also the portion of the main k-m should be made 2 in. if the wet return is made 2 in.

Notes on Gravity One-Pipe Air-Vent Systems

- Pitch of mains should not be less than $\frac{1}{4}$ in. in 10 ft.
- Pitch of horizontal runouts to risers and radiators should not be less than $\frac{1}{2}$ in. in 10 ft. Where this pitch cannot be obtained runouts over 8 ft in length should be one size larger than called for in the table.
- In general, it is not desirable to have a main less than 2 in. The diameter of the far end of the supply main should not be less than half its diameter at its largest part.
- Supply mains, branches to risers, or risers, should be dripped where necessary.