

Gravity one-pipe air-vent systems in which the equivalent length of run does not exceed 200 ft should be sized by means of Tables 4, 5 and 6 as follows:

1. For the steam main and dripped runouts to risers where the steam and condensate flow in the same direction, use $\frac{1}{16}$ -psi 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 $\frac{1}{4}$ psi. The return piping sizes should corres-

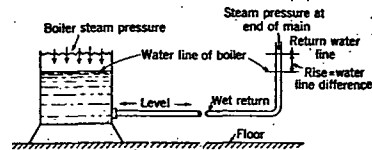


FIG. 6. DIFFERENCE IN STEAM PRESSURE ON WATER IN BOILER AND AT END OF STEAM MAIN

pond with the drop used on the steam side of the system: Thus, where $\frac{1}{24}$ -psi 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 $\frac{1}{24}$ psi); the dry return from Column R; and the wet return from Column Q.

With a $\frac{1}{32}$ -psi drop the sizing would be the same as for $\frac{1}{24}$ psi 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.

Notes on Gravity One-Pipe Air-Vent Systems

1. Pitch of mains should not be less than $\frac{1}{4}$ in. in 10 ft.
2. 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.
3. 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.
4. Supply mains, runouts to risers, or risers, should be dripped where necessary.
5. Where supply mains are decreased in size they should be dripped, or be provided with eccentric couplings, flush on bottom.

Example 4. Size the one-pipe gravity steam system shown in Fig. 7 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 $\frac{1}{4}$ psi

TABLE 7. PIPE SIZES FOR ONE-PIPE UP-FEED SYSTEM SHOWN IN FIG. 7

PART OF SYSTEM	SECTION OF PIPE	RADIATION SUPPLIED EDR 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
Runout 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

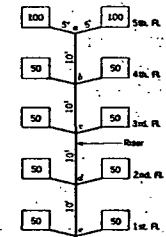


FIG. 7. RISER, SUPPLY MAIN AND RETURN MAIN OF ONE-PIPE SYSTEM

the drop per 100 ft will be slightly less than $\frac{1}{16}$ psi. It would be well in this case to use $\frac{1}{24}$ psi, and this would result in the theoretical sizes indicated in Table 7. 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.

ONE-PIPE VAPOR SYSTEM

The one-pipe vapor system operates under pressures at or near atmospheric and returns its condensation to the boiler by gravity. In this

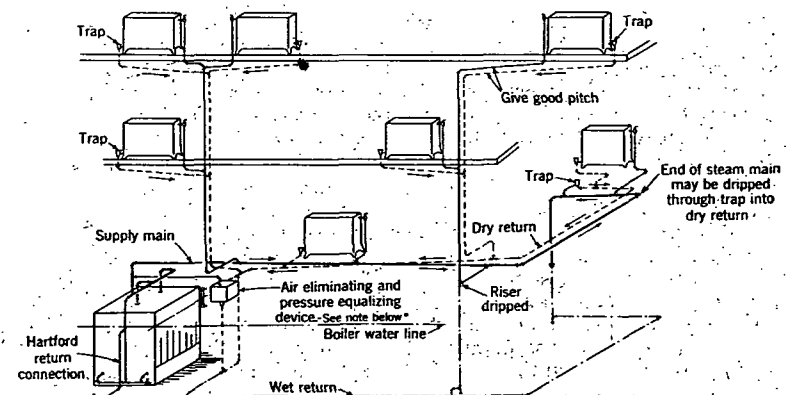


FIG. 8. TYPICAL UP-FEED SYSTEM WITH AUTOMATIC RETURN TRAP*

*Proper piping connections are essential with special appliances for pressure equalizing and air elimination.