

capacities of branches to risers and radiators are based upon past experience and the Laboratory's findings.

Table 9 is for small two-pipe systems, and is similar to Table 8. It gives values for parts of a two-pipe system. It was designed for laying out small two-pipe systems where the greatest equivalent length of run from the boiler to the farthest radiator does not exceed 200 ft.

Table 10 is recommended for laying out small vapor systems.

Table 11 and 12 were designed for larger one and two-pipe low-pressure gravity steam heating systems, respectively. These tables are based upon a 4 oz. pressure drop from the boiler to the farthest radiator and give capacities based upon such pressure drop for equivalent lengths ranging from 100 to 600 ft. These tables can be used for determining the size

TABLE 10. PIPE SIZES FOR TWO-PIPE, GRAVITY, VAPOR† SYSTEMS, WHERE EQUIVALENT LENGTH OF RUN FROM BOILER OR SOURCE OF SUPPLY TO FARTHEST RADIATOR DOES NOT EXCEED 200 FT.
Capacity in Sq. Ft. of Equivalent Radiation

PIPE SIZE INCHES	SUPPLY MAIN DRIPPED AND BRANCHES TO RISERS DRIPPED Steam and Condensate flowing in same direction.	SUPPLY RISERS Up-Feed	BRANCHES TO SUPPLY RISERS AND RADIATORS NOT DRIPPED	RETURN RISERS	WET RETURN MAIN	DRY RETURN MAIN
A	B	C	D*	E	F	G
3/4	---	30	---	190	---	---
1	56	56	26	450	700	320
1 1/4	122	122	58	990	1200	670
1 1/2	190	190	95	1500	1900	1058
2	386	386	195	3000	4000	2300
2 1/2	635	635	395	---	6700	3800
3	1163	1129	700	---	10,700	7000
3 1/2	1737	1548	1150	---	---	10,000
4	2457	2042	1700	---	---	---
5	4546	---	3150	---	---	---
6	7462	Different makes of supply and return valves, steam traps and other specialties vary as to capacity, therefore use size as recommended for any particular make. Vertical connections to be of same size as valve and trap used. Return horizontal runout to be not less than 1/4 in.				

Copyright, 1927 { AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS } Not to be Reprinted With-
Heating and Piping Contractors National Association } out Special Permission

*Radiator branches more than 8 ft. in length should be one size larger than shown in Col. D.

†This table is for systems which are open to atmosphere or operate under slight pressure or partial vacuum without use of vacuum pumps.

Note 1.—These tables apply where pipes are properly reamed. No allowances for defective material or workmanship have been made. (Also see Tables 18, 19 and 20).

Note 2.—Capacities based on 1/4 lb. condensation per square foot equivalent radiation and actual diameter of standard pipe.

Note 3.—Extra length to be added to straight run of pipe for various fittings and valves to determine equivalent length. (See Table 6.)

Note 4.—Where it is necessary to drip a supply main, supply riser or branch to a supply riser, same should be dripped separately into a wet return. The drip for a vapor or vacuum system may be taken into a dry return through a steam trap.

Note 5.—Pitch of pipe should be not less than 1/4 in. in 10 ft.; on horizontal branches to radiators, at least 1/2 in. in 10 ft.

of pipe necessary to handle a given amount of radiation, either in a main, branch to the riser, riser, or radiator branch. Risers, or branches to risers or radiators, must not, however, be loaded above the maximum capacities for different parts of the system as given in the tables.

Tables 13 and 14 are for sizing pipe for vapor systems where the equivalent length of run exceeds 200 ft. Table 13 is for systems up to 400 ft. equivalent length and is based upon a total pressure drop of 2 oz. from the source of steam supply to the farthest radiator. Table 14 is for larger systems where the equivalent length of run from the boiler or source of steam supply does not exceed 600 ft. It is based upon a total pressure drop of 4 oz. Risers and branches to risers and radiators should not be loaded above their maximum capacity as given in Columns F and G.

Table 15 is a pipe sizing table for small vacuum pump systems where the equivalent length of run from the boiler or source of steam supply to the farthest radiator ranges from 100 to 600 ft. The table is based upon a total pressure drop in the entire equivalent length from steam supply to farthest radiator of 4 oz. Up-feed risers, branches to risers and radiators should not be loaded beyond the maximum capacities given in Columns H and I.

Table 16 is similar to Table 15 and is for larger systems where the equivalent length of run ranges up to 1200 ft. It is based on a total pressure drop of 8 oz. in the entire equivalent length.

In designing any kind of a heating system it is well to avoid excessive pressure drop in any part of the system. While under proper design and good workmanship, higher drop may give good results, it is generally not considered good practice to exceed a drop of 1 oz. in 100 ft. equivalent length.

TYPICAL EXAMPLE

Example in the use of the tables for determining the size of pipe necessary in various parts of the vacuum pump system are shown in the accompanying diagram (Page 109):

The equivalent length of run from the source of steam supply A to the farthest radiator supplied by any supply main (or the radiator on floor g Riser E) is between 600 and 800 ft.—therefore size the entire run according to Column H, Table 16, observing Note 4 as regards maximum capacity of up-feed supply risers given in Column K.

PART OF SYSTEM	SECTION OF PIPE	RADIATION SUPPLIED, SQ. FT.	PIPE SIZE, INCHES
Riser E	f to g	400	2 1/4
" "	e to f	600	2 1/2
" "	d to e	800	3
" "	c to d	1000	3 1/2
" "	b to c	1200	4
" "	a to b	1400	4 1/2
Branch	to Riser E	1400	4
Supply Main	D to E	1600	3 1/2
" "	C to D	2400	4
" "	B to C	3200	5
" "	A to B	4800	6

The equivalent length of run from the source of steam supply A to the farthest radiator supplied by riser D is between 500 and 600 ft.—therefore size riser D and its branch according to Column G observing Note 4 as regards maximum capacity of up-feed risers given in Column K. Note that the maximum allowable capacity of the