TABLE 13. PIPE SIZES FOR TWO-PIPE VAPOR† HEATING SYSTEMS, WHERE EQUIVALENT LENGTH OF RUN FROM BOILER OR SOURCE OF SUPPLY TO FARTHEST RADIATOR Exceeds 200 FT.

Capacity in Sq. Ft. Equivalent Radiation

PIPE SIZE INCHES	EQUIVALENT LENGTH OF PIPE FROM BOILER TO FARTHEST RADIATOR, INCLUDING MAIN AND RISER. (See *Note 4.*) Supply Main Dripped and Branches to Risers Dripped—Steam and Condensate flowing in same direction. BASED ON 2 OZ. TOTAL PRESSURE DROP				MAXIMUM CAPACITIES		
	100 Ft.	200 Ft.	300 Ft.	400 Ft.	Supply Risers Up-Feed	Branches to Supply Risers and Radiators Not Dripped	Return Risers
A	*B*	*C*	*D*	*E*	*F*	*G**	*H*
¾	.....	.....	.....	.....	30	.....	190
1	79	56	46	39	56	26	450
1¼	173	122	100	87	122	58	990
1½	269	190	155	134	190	95	1500
2	546	386	315	273	386	195	3000
2½	898	635	518	449	635	395	.....
3	1645	1163	948	822	1129	700	.....
3½	2457	1737	1419	1228	1548	1150	.....
4	3475	2457	2011	1738	2042	1700	.....
5	6929	4546	3712	3214	.....	3150	.....
6	10,553	7462	6094	5276			
8	21,967	15,533	12,682	10,983			
10	40,085	23,345	23,144	20,043			
12	64,336	45,492	37,145	32,168			

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 ¾ in.

PIPE SIZE INCHES	DRY RETURN MAIN — EQUIVALENT LENGTH OF RUN FROM BOILER TO FARTHEST RADIATOR IN FEET				WET RETURN MAIN — EQUIVALENT LENGTH OF RUN FROM BOILER TO FARTHEST RADIATOR IN FEET			
	100	200	300	400	100	200	300	400
I	*J*	*K*	*L*	*M*	*N*	*O*	*P*	*Q*
1	355	320	285	248	1000	700	580	500
1¼	745	670	595	520	1700	1200	990	850
1½	1173	1058	943	822	2700	1900	1570	1350
2	2680	2300	2140	1880	5600	4000	3240	2800
2½	4300	3800	3470	3040	9400	6700	5300	4700
3	7800	7000	6250	5480	15,000	10,700	8500	7500
3½	11,100	10,000	8800	7880	22,000	16,000	13,200	11,000
4	16,700	15,000	13,400	11,700	31,000	22,000	18,300	15,500

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

†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 of workmanship have been made. (Also see Tables 18, 19 and 20).

Note 2.—Capacities based on ¼ 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.—Mains are to be proportioned according to the equivalent length of run from the boiler or source of supply to the farthest radiators supplied by the main.

Determine equivalent length of run then use figures in that corresponding Column (*B* to *E*) for supply mains; (*J* to *M*) for dry return mains; (*N* to *Q*) for wet return mains for sizing the entire run.

Supply and return risers are to be proportioned according to the equivalent length of run from the boiler or source of supply to the farthest radiator on each riser.

For supply risers determine the distance from the boiler to the farthest radiator served by that riser then use the figures in the corresponding Column (*B* to *E*) for sizing each supply riser; providing the amount of radiation for that riser does not exceed amounts shown in Column *F*. Where supply riser capacities are found to be in excess of amounts shown in Column *F*, step up to necessary size indicated in that column. For return risers determine the equivalent length of run in feet from the top of each riser to the boiler then use the figures in the corresponding Columns (*J* to *M*) for sizing each riser.

Note 5.—Where it is necessary to drip a supply main or a supply riser or a branch to a supply riser, same should drip 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 6.—Pitch of pipe should be not less than ¼ in. in 10 ft.; on horizontal branches to radiators, at least ½ in. in 10 ft.

TABLE 14. PIPE SIZES FOR TWO-PIPE VAPOR† HEATING SYSTEMS, WHERE EQUIVALENT LENGTH OF RUN FROM BOILER OR SOURCE OF SUPPLY TO FARTHEST RADIATOR Exceeds 200 FT.

Capacity in Sq. Ft. of Equivalent Radiation

PIPE SIZE INCHES	EQUIVALENT LENGTH OF PIPE FROM BOILER TO FARTHEST RADIATOR, INCLUDING MAIN AND RISER. (See *Note 4.*) Supply Main Dripped and Branches to Risers Dripped—Steam and Condensate flowing in same direction. BASED ON 4 OZ. TOTAL PRESSURE DROP						MAXIMUM CAPACITIES		
	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	Supply Risers Up-Feed	Branches to Supply Risers and Radiators Not Dripped	Return Risers
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I**	*J*
¾	.....	.....	.....	.....	.....	.....	30	.....	190
1	111	79	65	56	49	46	56	26	450
1¼	245	173	141	122	110	100	122	58	990
1½	380	269	220	190	165	155	190	95	1500
2	771	546	446	386	345	315	386	195	3000
2½	1270	898	734	635	568	518	635	395	.....
3	2326	1645	1342	1163	1040	948	1129	700	.....
3½	3474	2457	2006	1737	1552	1419	1548	1150	.....
4	4914	3475	2828	2457	2196	2011	2042	1700	.....
5	9092	6429	5250	4546	4062	3712	.....	3150	.....
6	14,924	10,553	8618	7462	6669	6094			
8	31,066	21,967	17,935	15,533	13,880	12,682			
10	56,689	40,085	32,730	28,345	25,334	23,144			
12	90,985	64,336	52,530	45,492	40,660	37,145			

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 ¾ in.

PIPE SIZE INCHES	DRY RETURN MAIN — EQUIVALENT LENGTH OF RUN FROM BOILER TO FARTHEST RADIATOR IN FEET						WET RETURN MAIN — EQUIVALENT LENGTH OF RUN FROM BOILER TO FARTHEST RADIATOR IN FEET					
	100	200	300	400	500	600	100	200	300	400	500	600
K	*L*	*M*	*N*	*O*	*P*	*Q*	*R*	*S*	*T*	*U*	*V*	*W*
1	460	412	368	320	322	275	1400	1000	820	700	590	600
1¼	962	868	770	670	579	480	2400	1700	1420	1200	1020	860
1½	1512	1362	1210	1058	909	757	3800	2700	2260	1900	1560	1300
2	3300	2960	2640	2300	1980	1630	8000	5600	4500	4000	3360	2800
2½	5450	4900	4380	3800	3300	2770	13,400	9400	7600	6700	5700	4800
3	10,000	9000	8000	7000	6000	5000	21,400	15,000	12,300	10,700	9300	7800
3½	14,300	12,900	11,500	10,000	8600	7200	32,000	22,000	24,000	16,000	13,600	11,400
4	21,500	19,300	17,200	15,000	12,900	10,700	44,000	31,000	26,000	22,000	20,500	15,400

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

†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 ¼ 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.—Mains are to be proportioned according to the equivalent length of run from the boiler or source of supply to the farthest radiators supplied by the main.

Determine equivalent length of run then use figures in that corresponding Column (*B* to *G*) for supply mains; (*L* to *Q*) for dry return mains; (*R* to *W*) for wet return mains for sizing the entire run.

Supply and return risers are to be proportioned according to the equivalent length of run from the boiler or source of supply to the farthest radiator on each riser.

For supply risers determine the distance from the boiler to the farthest radiator served by that riser then use the figures in the corresponding Column (*B* to *G*) for sizing each supply riser; providing the amount of radiation for that riser does not exceed amounts shown in Column *H*. Where supply riser capacities are found to be in excess of amounts shown in Column *H*, step up to necessary size indicated in that column. For return risers determine the equivalent length of run in feet from the top of each riser to the boiler then use the figures in the corresponding Columns (*L* to *Q*) for sizing each riser.

Note 5.—Where it is necessary to drip a supply main or a supply riser or a branch to a supply riser, same should drip separately into a wet return. The drip for a vapor or a vacuum system may be taken into a dry return through a steam trap.

Note 6.—Pitch of pipe should be not less than ¼ in. in 10 ft.; on horizontal branches to radiators, at least ½ in. in 10 ft.