

TABLE 10. PIPE SIZES FOR ONE-PIPE, GRAVITY, LOW PRESSURE STEAM 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

Based on 4 oz. Total Pressure Drop

PIPE SIZE INCHES	EQUIVALENT LENGTH OF PIPE FROM BOILER TO FARTHEST RADIATOR, INCLUDING MAIN AND RISER (See Note 5.)						MAXIMUM CAPACITIES		
	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	Radiator Valves and Vertical Connections
	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.			
A	B	C	D	E	F	G	H	I	J
1	111	79	65	56	49	46	45	20	20
1 1/4	245	173	141	122	110	100	98	55	55
1 1/2	380	269	220	190	165	155	152	81	81
2	771	546	446	386	345	315	288	165	165
2 1/2	1270	898	734	635	568	518	464	260	-----
3	2326	1645	1342	1163	1040	948	799	475	-----
3 1/2	3474	2457	2006	1737	1552	1419	1144	745	-----
4	4914	3475	2828	2457	2196	2011	1520	1110	-----
5	9092	6429	5250	4546	4062	3712	-----	2180	-----
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	-----	-----	-----

PIPE SIZE INCHES	DRY RETURN MAIN						WET RETURN MAIN					
	EQUIVALENT LENGTH OF RUN FROM BOILER TO FOOT OF FARTHEST RISER IN FEET						EQUIVALENT LENGTH OF RUN FROM BOILER TO FOOT OF FARTHEST RISER 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	275	227	1400	1000	820	700	640	580
1 1/4	962	868	770	670	579	480	2400	1700	1390	1200	1080	990
1 1/2	1512	1362	1210	1058	909	757	3800	2700	2180	1900	1710	1570
2	3300	2960	2640	2300	1980	1630	8000	5600	4520	4000	3560	3240
2 1/2	5450	4900	4380	3800	3300	2770	13,400	9400	7600	6700	6000	5300
3	10,000	9000	8000	7000	6000	5000	21,400	15,000	12,500	10,700	9400	8500
3 1/2	14,300	12,900	11,500	10,000	8600	7200	32,000	22,000	18,500	16,000	14,400	13,200
4	21,500	19,300	17,200	15,000	12,900	10,700	44,000	31,000	25,500	22,000	19,900	18,300

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INSTRUCTIONS FOR USING TABLE 10

1. Radiator branches more than 8 ft. in length should be one size larger than shown in Column I.
2. These tables apply where pipes are properly reamed. No allowances for defective material or workmanship have been made. (Also see Tables 7 and 8).
3. Capacities based on 1/4 lb. condensation per square foot per hour equivalent radiation and actual diameter of standard pipe.
4. Extra length to be added to straight run of pipe for various fittings and valves to determine equivalent length. (See Table 4).

INSTRUCTIONS FOR USING TABLE 10 (Continued)

5. 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 corresponding Columns (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.

For example: If the distance from boiler or source of supply to the farthest radiator on the longest main should be 300 ft., all mains are to be sized from Column D; if 400 ft., Column E; if 600 ft., Column G.

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 particular riser.

Determine the distance to the farthest radiator then use the figures in the corresponding Columns (B to G) for sizing each riser; providing the amount of radiation for that riser does not exceed amounts shown in Column H. Where riser capacities are found to be in excess of amounts in Column H, step up to necessary size indicated in that column.

For example: If the distance from the boiler or source of supply to the farthest radiator on a supply riser is 300 ft., that riser is to be sized from Column D, providing the amount of radiation does not exceed the amount shown in Column H. If the amount exceeds that in Column H, use amounts shown in Column H for sizing that entire riser.

If another riser taken from the same main as the one above is only 200 ft., this riser should be sized from Column C, providing the amount of radiation does not exceed that as shown in Column H.

6. The Guide Committee, 1930, after many check-tests, suggest that for practical purposes the pipe sizes on the usual heating system may be determined by using the pressure drop indicated by the longest main and riser on that system, neglecting the separate computations for each separate shorter run.

7. Where it is necessary to drip a steam main, branch to riser or risers, same should be dripped separately into wet return.

8. Pitch of mains should be not less than 1/4 in. in 10 ft.; on horizontal branches to radiators and risers at least 1/2 in. in 10 ft.

9. In general it is desirable not to have a supply main smaller than 2 in. in diameter. When the supply main is larger than 2 1/2 in. at the beginning, it is desirable that it shall not be smaller than 2 1/2 in. at the end.

is high and where all heaters are well above the water line, and where they do not have unusual condensing power, these sizes are permissible. The difference here is 4 oz., or approximately 8 in.

Vacuum Pump Systems

Fig. 5 shows a typical vacuum system of steam heating, using a pump which handles both the air from the system and the water of condensation from it. With such arrangements a wide difference in pressure between that in the supply main and that in the return main is permissible. A greater temperature range within the system than that obtainable with vapor systems is insured. Heaters may be below the water line of the boiler, and even may be lower than the level of the pump, though such an arrangement generally should be avoided.

Table 15 gives approved pipe sizes for vacuum pump systems of comparatively small size, with a pressure drop not exceeding 4 oz., or a rise in the return connection of about 8 in., which, of course, easily can be overcome by the vacuum pump.

Table 16 gives pipe sizes for larger systems in which the vacuum pump is expected to maintain a greater suction, the allowable rise in the return connection being about 16 in.