

TABLE 16. PIPE SIZES FOR VACUUM PUMP 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 8 oz. Total Pressure Drop

PIPE SIZE IN.	EQUIVALENT LENGTH OF PIPE FROM BOILER TO FARTHEST RADIATOR, INCLUDING MAIN AND RISER. (See Note 6.)									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
	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	800 Ft.	1000 Ft.	1200 Ft.		
A	B	C	D	E	F	G	H	I	J	K	L
1 1/4	157 346	111 245	92 200	79 173	70 154	65 141	56 122	49 110	46 100	56 122	26 58
1 1/2	538 1091	380 771	310 630	269 546	240 487	220 446	190 386	165 345	155 315	190 386	95 195
2 1/2	1797 3289	1270 2326	1036 1896	898 1645	803 1470	734 1342	635 1163	568 1040	518 948	635 1129	395 700
3 1/2	4913 6950	3474 4914	2838 4022	2457 3475	2196 3106	2006 2828	1737 2457	1552 2196	1419 2011	1548 2042	1150 1700
5	12,858	9092	7424	6429	5747	5250	4546	4062	3712	.....	3150
6	21,105	14,924	12,168	10,553	9433	8618	7462	6669	6084	.....	.....
8	43,934	31,066	25,364	21,967	19,638	17,935	15,533	13,880	12,682	.....	.....
10	80,171	56,689	46,288	40,085	35,836	32,730	28,345	25,334	23,144	.....	.....
12	128,672	90,985	74,290	64,336	57,516	52,530	45,492	40,660	37,145	.....	.....
16	240,245	169,879	138,381	121,012	107,389	98,500	84,849	75,917	69,671	.....	.....

PIPE SIZE INCHES		RETURN MAINS AND RISERS									
Riser	Main	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	800 Ft.	1000 Ft.	1200 Ft.	
M	N	O	P	Q	R	S	T	U	V	W	
.....	3/4	1130	800	653	568	505	462	400	358	326	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 connection to be of same size as valve and trap used. Return horizontal runout to be not less than 3/4 in.
1 1/4	1	1977	1400	1143	994	884	810	700	626	570	
1 1/2	1 1/4	3390	2400	1960	1704	1515	1387	1200	1073	976	
2 1/2	1 1/2	5370	3800	3103	2696	2400	2195	1900	1698	1547	
3 1/2	2	11,300	8000	6533	5680	5050	4622	4000	3575	3256	
4	2 1/2	18,925	13,400	10,940	9510	8460	7745	6700	5990	5453	
5	3	30,230	21,400	17,460	15,190	13,510	12,360	10,700	9565	8710	
6	3 1/2	45,200	32,000	26,130	22,710	20,200	18,490	16,000	14,300	13,020	
8	4	62,180	44,000	35,950	31,220	27,800	25,430	22,000	19,660	17,910	
10	5	109,300	77,400	63,200	54,920	48,800	44,720	38,700	34,600	31,500	
16	6	175,100	124,000	101,200	88,000	78,200	71,700	62,000	55,410	50,450	

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INSTRUCTIONS FOR USING TABLE 16

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

2. It is not generally considered good practice to greatly exceed 1 oz. drop in pressure in each 100 ft. equivalent length of run nor to exceed 1 lb. total pressure drop in any system.

3. These tables apply where pipes are properly reamed. No allowances for defective material or workmanship have been made. (Also see Tables 7 and 8).

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

5. Extra length to be added to straight run of pipe, for various fittings and valves to determine equivalent length. (See Table 4).

6. 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 J) 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.

Supply 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 figures in corresponding Columns (B to J) for sizing each riser; providing the amount of radiation for that riser does not exceed amounts shown in Column K. Where riser capacities are found to be in excess of amounts shown in Column K, 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 K. If the amount exceeds that in Column K, use amounts shown in Column K for sizing that entire riser.

If another riser taken from the same main as the one indicated 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 K.

7. 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.

8. Return mains and risers are to be proportioned according to the equivalent distance in feet, from farthest radiator to the vacuum pump; using capacities in corresponding Columns (O to W) for sizing entire return riser (Column M) and return main (Column N). The return pipe sizes are conservative and are subject to revision upon the completion of pending research investigations.

9. Where it is necessary to drip a supply main, supply riser or branch to a supply riser, same should be dripped separately through a steam trap into vacuum return. Never drip a supply riser into a vacuum return except through a steam trap.

10. Lift fittings. (See page 362).

11. 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.

12. 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.