

TABLE 8. STEAM PIPE CAPACITIES FOR 30 PSIG STEAM SYSTEMS*
Capacity Expressed in Pounds per Hour
(Steam and Condensate Flowing in Same Direction)

PIPE SIZE INCHES	DROP IN PRESSURE—POUNDS PER 100 FT IN LENGTH					
	1/8	1/4	3/8	1/2	3/4	1
3/4	15	22	31	38	45	63
1	31	46	63	77	89	125
1 1/4	69	100	141	172	199	281
1 1/2	107	154	219	267	309	437
2	217	313	444	543	627	886
2 1/2	358	518	730	924	1,030	1,460
3	651	940	1,330	1,630	1,830	2,660
3 1/2	979	1,410	2,000	2,450	2,830	4,000
4	1,390	2,000	2,830	3,460	4,000	5,660
5	2,560	3,640	5,230	6,400	7,390	10,500
6	4,210	6,030	8,590	10,400	12,100	17,200
8	8,750	12,600	17,900	21,900	25,300	35,100
10	16,300	23,500	33,200	40,600	46,900	66,400
12	25,600	36,900	52,300	64,000	74,000	104,500

* Note: Steam at an average pressure of 30 psig is used as the basis for calculating the above table.

sized from Column C; radiator runouts and undrilled 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 $\frac{1}{4}$ psi); the dry return from Column R; and the wet-return from Column Q.

With a $\frac{1}{4}$ -psi drop the sizing would be the same as for $\frac{1}{4}$ 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 $\frac{1}{4}$ in. per foot. 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.

TABLE 9. STEAM PIPE CAPACITIES FOR 150 PSIG STEAM SYSTEMS*
Capacity Expressed in Pounds per Hour
(Steam and Condensate Flowing in Same Direction)

PIPE SIZE INCHES	DROP IN PRESSURE—PSI PER 100 FT IN LENGTH						
	1/8	1/4	3/8	1/2	3/4	1	5
3/4	29	41	58	71	82	116	184
1	58	82	117	143	165	233	369
1 1/4	130	185	262	320	370	523	827
1 1/2	203	287	407	497	575	815	1,290
2	412	583	825	1,010	1,170	1,650	2,600
2 1/2	683	959	1,360	1,650	1,920	2,710	4,290
3	1,240	1,750	2,480	3,020	3,500	4,940	7,820
3 1/2	1,860	2,630	3,720	4,550	5,250	7,420	11,700
4	2,630	3,720	5,290	6,430	7,430	10,500	16,600
5	4,860	6,880	9,730	11,900	13,800	19,500	30,800
6	7,980	11,300	16,000	19,500	22,600	31,900	50,400
8	16,600	23,500	33,200	40,600	47,000	66,400	105,000
10	30,500	43,400	61,700	75,600	87,300	123,000	195,000
12	48,600	68,800	97,300	119,000	138,000	194,000	307,500

* Note: Steam at an average pressure of 150 psig is used as the basis for calculating the above table.

TABLE 10. RETURN PIPE CAPACITIES FOR 30 PSIG STEAM SYSTEMS*
Capacity Expressed in Pounds per Hour

PIPE SIZE INCHES	DROP IN PRESSURE—POUNDS PER 100 FT IN LENGTH				
	1/8	1/4	3/8	1/2	1
3/4	115	170	245	308	365
1	230	340	490	615	730
1 1/4	485	710	1,025	1,290	1,530
1 1/2	790	1,160	1,670	2,100	2,500
2	1,580	2,360	3,400	4,300	5,050
2 1/2	2,650	3,900	5,600	7,100	8,400
3	4,850	7,100	10,300	12,900	15,300
3 1/2	7,200	10,600	15,300	19,200	22,800
4	10,200	15,000	21,600	27,000	32,300
5	19,000	27,800	40,300	55,500	60,000
6	31,000	45,500	65,500	83,000	98,000

* Note: The above table is based on steam at pressures of 0 to 4 psig.

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 3: Size the one-pipe gravity steam system shown in Fig. 19 assuming that this is all there is to the system, or that the riser and main 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 the drop per 100 ft will be slightly less than $\frac{1}{4}$ psi. It would be well in this case to use $\frac{1}{4}$ psi, and this would result in the theoretical sizes indicated in Table 12. 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.

SIZING PIPING FOR ONE-PIPE VAPOR SYSTEMS

Piping for one-pipe vapor systems is sized so as to permit only a few ounces pressure drop in the system. Otherwise, the method follows that outlined for sizing one-pipe gravity systems.

TABLE 11. RETURN PIPE CAPACITIES FOR 150 PSIG STEAM SYSTEMS*
Capacity Expressed in Pounds per Hour

PIPE SIZE INCHES	DROP IN PRESSURE—PSI PER 100 FT IN LENGTH					
	1/8	1/4	3/8	1/2	1	2
3/4	156	232	360	465	560	890
1	313	462	690	910	1,120	1,780
1 1/4	650	960	1,500	1,950	2,330	3,700
1 1/2	1,070	1,580	2,460	3,160	3,800	6,100
2	2,160	3,200	4,950	6,400	7,700	12,300
2 1/2	3,600	5,350	8,200	10,700	12,800	20,400
3	6,500	9,600	15,000	19,500	23,300	37,200
3 1/2	9,600	14,400	22,300	28,700	34,500	55,000
4	13,700	20,500	31,600	40,500	49,200	78,500
5	25,600	38,100	58,500	76,000	91,500	146,000
6	42,000	62,500	96,000	125,000	150,000	238,000

* Note: The above table is based on steam at pressures of 1 to 20 psig.