

TABLE 5. MAXIMUM ALLOWABLE CAPACITIES OF UP-FEED RISERS FOR ONE-PIPE LOW PRESSURE STEAM

Based on A. S. H. V. E. Research Laboratory Tests

PIPE SIZE	VELOCITY FEET PER SECOND	PRESSURE DROP OUNCES PER 100 FT.	CAPACITY		
			Sq. Ft. Radiation	B.t.u. per Hour	Lb. Steam per Hour
A	B	C	D	E	F
1"	14.1	0.68	45	10,961	11.3
1¼"	17.6	0.66	98	23,765	24.5
1½"	20.0	0.66	152	36,860	38.0
2"	23.0	0.57	288	69,840	72.0
2½"	26.0	0.54	464	112,520	116.0
3"	29.0	0.48	799	193,600	199.8
3½"	31.0	0.44	1144	277,000	286.0
4"	32.0	0.39	1520	368,000	380.0

Note 1.—Above capacities should never be exceeded on one-pipe risers.

Note 2.—Capacities based on ¼ lb. condensation per square foot equivalent radiation and actual diameter of standard pipe.

Note 3.—All pipe should be well reamed and free from constrictions. Fittings should be up to size. (See Tables 8 and 9.)

TABLE 6. MAXIMUM ALLOWABLE CAPACITIES OF UP-FEED RISERS FOR TWO-PIPE LOW PRESSURE STEAM

Based on A. S. H. V. E. Research Laboratory Tests

PIPE SIZE	VELOCITY FEET PER SECOND	PRESSURE DROP OUNCES PER 100 FT.	CAPACITY		
			Sq. Ft. Radiation	B.t.u. per Hour	Lb. Steam per Hour
A	B	C	D	E	F
¾"	20		40	9550	10.0
1"	23	1.78	74	17,900	18.45
1¼"	27	1.57	151	36,500	37.65
1½"	30	1.48	228	55,200	57.0
2"	35	1.33	438	106,100	109.5
2½"	38	1.16	678	164,100	169.4
3"	41	0.95	1129	273,500	282.2
3½"	42	0.81	1548	375,500	387.0
4"	43	0.71	2042	495,000	510.5

Note 1.—Above capacities should never be exceeded on two-pipe risers.

Note 2.—Capacities based on ¼ lb. condensation per square foot equivalent radiation and actual diameter of standard pipe.

Note 3.—All pipe should be well reamed and free from constrictions. Fittings should be up to size. (See Tables 8 and 9.)

of 1 oz. per 100 ft. where the greatest equivalent length of run from the boiler to the farthest heating unit does not exceed 200 ft.

Table 12 is recommended for laying out small vapor systems on a basis of 1 oz. per 100 ft. where the greatest equivalent length of run from the boiler to the farthest heating unit does not exceed 200 ft.

Tables 13 to 18 were compiled from the test data of the Society's Research Laboratory and are for various types of balanced systems with different total pressure drops. These tables with their foot-notes may be used by any one with a knowledge of the profession to obtain satisfactory results. They cover the larger systems with total equivalent length of runs from 100 to 1200 ft.

Tables 13 and 14 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 heating unit 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 of pipe necessary to handle a given amount of heating surface, either in a main, branch to the riser, riser, or heating unit branch. Risers, or branches to risers or heating units, must not, however, be loaded above

TABLE 7. COMPARATIVE CAPACITY OF STEAM LINES AT VARIOUS PITCHES*

Pitch of Pipe in Inches per 10 Ft.

PIPE SIZE	¼ IN.		½ IN.		1 IN.		1½ IN.		2 IN.		3 IN.		4 IN.		5 IN.	
	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.
¾"	25.0	12	30.3	14	37.3	18	40.4	19	42.5	20	46.1	21	47.5	22	49.3	23
1"	45.8	12	52.6	15	63.0	17	70.0	20	75.2	22	83.0	23	87.9	25	90.2	26
1¼"	104.9	18	117.2	20	133.0	23	144.5	25	154.0	27	165.0	28	172.6	29	178.2	31
1½"	142.6	18	159.0	21	181.0	23	196.5	25	209.3	27	224.0	28	234.8	30	242.6	31
2"	236.0	19	263.5	20	299.5	23	325.5	25	346.5	27	371.5	28	388.4	29	401.1	30

TABLE 8. EFFECT OF REAMING ENTRANCE TO ONE-PIPE RISERS*

	Maximum Capacity of Riser	Per Cent Decrease
Reamed entrances.....	24.7 lb. per hr.	0.0
Rounded entrances.....	23.9 lb. per hr.	3.2
Squared entrances.....	22.2 lb. per hr.	10.1
Three wheel cutter.....	19.2 lb. per hr.	22.2
Single wheel cutter.....	17.6 lb. per hr.	28.7

TABLE 9. PER CENT DIFFERENCE IN CAPACITY DUE TO VARIATION OF PIPE SIZE AND SMOOTHNESS*

Capacity of Pipe.....	MAXIMUM CONDENSATION, LB. PER HR.			
	¾"	1"	1¼"	1½"
Minimum.....	14.00	24.89	45.42	70.50
Maximum.....	15.20	30.08	52.08	82.00
Per Cent Variation.....	8.6	20.8	14.7	16.3

*Data from AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS Research Laboratory.