

Table 5 on the basis of a demand of 25 per cent of the connected load and a 10-lb. pressure drop per 100 ft.

For risers in residences use the pipe sizes in Table 1.

TABLE 5. AMOUNT OF WATER IN GALLONS PER MINUTE WHICH WILL FLOW THROUGH VARIOUS SIZED PIPES FOR VARIOUS PRESSURE DROPS

FRICTION PRESSURE DROP POUNDS PER SQUARE INCH PER 100-FT. RUN	PIPE SIZES IN INCHES								
	¾	1	1¼	1½	2	2½	3	3½	4
5	5.4	11	19	30	62	109	171	252	353
7	6.4	13	23	36	74	129	203	298	418
10	7.6	15	27	43	88	154	242	357	499
20	10.8	22	38	61	125	218	343	504	706
30	13.2	27	47	76	153	267	420	618	864
40	15.0	31	54	86	176	308	485	714	998
50	17.0	35	60	96	197	345	542	800	1115
75	21.0	43	74	117	242	423	665	978	1365
100	24.0	49	85	136	278	485	769	1130	1578
125	27.0	55	96	152	311	544	858	1260	1765
150	30.0	60	105	166	341	598	939	1380	1930

TABLE 6. WATER PRESSURE REQUIRED TO DELIVER WATER TO TOP OF VERTICAL RISER WITH 15 LB. PRESSURE AT THE TOP BRANCH AND TO GIVE ADEQUATE SERVICE AT VERTICAL HEIGHTS GIVEN

WATER PRESSURE IN LB. REQUIRED TO DELIVER WATER TO TOP OF RISER WITH 15 LB. TERMINAL PRESSURE*				STATIC HEAD IN LB. PER SQ. IN.	VERTICAL RISE OF WATER FROM MAIN TO HIGHEST FIXTURE BRANCH	WATER PRESSURE IN LB. REQUIRED TO GIVE ADEQUATE SERVICE AT VERTICAL HEIGHTS GIVEN			
Pressure Drop per 100 Ft.						Horizontal Run from Supply to Riser			
5 lb.	7 lb.	10 lb.	20 lb.			25' 0"	50' 0"	75' 0"	100' 0"
15	15	15	15	0	0	22.8 lb.	25.3 lb.	27.8 lb.	30.3 lb.
20.5	20.7	21	22	4.33	10	28.1 "	30.6 "	33.1 "	35.6 "
25	25.4	26	28	8.66	20	33.5 "	36 "	38.5 "	41 "
29.5	30.1	31	34	12.99	30	38.8 "	41.3 "	43.8 "	46.3 "
35	35.8	37	41	17.32	40	44.1 "	46.6 "	49.1 "	51.6 "
39.5	40.5	42	47	21.65	50	49.5 "	52 "	54.5 "	57 "
44	45.2	47	53	25.99	60	54.8 "	57.3 "	59.8 "	62.3 "
49.5	50.9	53	60	30.32	70	60.1 "	62.6 "	65.1 "	67.6 "
54	55.6	58	64	34.65	80	65.2 "	67.7 "	70.2 "	72.7 "
58.5	60.3	63	72	38.98	90	70.8 "	73.3 "	75.8 "	78.3 "
64	66	69	79	43.31	100	76.1 "	78.6 "	81.1 "	83.6 "
68.5	70.7	74	85	47.64	110	81.5 "	84 "	86.5 "	89 "
73	75.4	79	91	51.97	120	86.8 "	89.3 "	91.8 "	94.3 "
77.5	80.1	84	97	56.30	130	92.1 "	94.6 "	97.1 "	99.6 "
83	85.9	90	104	60.63	140	97.5 "	100 "	102.5 "	105 "
87.5	90.5	95	110	64.96	150				

*The water pressures given in this table are the pressures at the base of the riser, necessary to deliver water to top of riser with a terminal pressure of 15 lb. when discharging the number of gallons per minute called for in Table 5, at the pressure drop indicated.

bBased upon 10 lb. pressure drop per 100 ft. run of pipe and a terminal pressure of 15 lb. at the uppermost fixture. A terminal pressure of 15 lb. has been selected for operation of flush valves. For terminal pressure of 10 lb., deduct 5 lb. from the figures given above; or for a terminal pressure of 5 lb., deduct 10 lb. from above values.

In estimating the pipe size for any part of a riser in a building of several stories, take 60 per cent of the water to be used on any story and all stories above as determined from Table 1 and deduct 10 per cent for each story above. This reduction in estimated amount is to take care of

probable use. Thus, if 100 gal. per minute are used on each story of a 10-story building the size of pipe will be determined as in Table 2.

The pressure drop of 30 lb. per 100 ft. of run will give satisfactory results for branches on the top story. A higher pressure drop can be used on stories below, corresponding with the pressures as given in Table 5, which shows that for a building 100 ft. in height, a pressure drop of 100 lb. can be used on the lowest fixture branches, and that for a building 50 ft. in height, a pressure drop of 52 lb. can be used on the lowest fixture branches. Table 1, however, can be used with safety on any of the stories but will give pipe sizes larger than necessary for the lower stories in a very tall building.

Tables 3 and 4 may be used alternatively with Table 2, being adapted for very rapid determinations in the case of large apartment houses.

Example: What is the riser size needed for a six-story apartment house having one bath for each apartment?

Table 3 gives 2 in. diameter for all from four to twelve stories with 1¼ in. to supply the top story and next to top and 1½ in. for story below.

What is the size of riser needed for a twelve-story apartment house with three baths to each apartment?

Table 3 gives 2½ in. for all stories up to eighth floor, 2 in. for ninth, tenth and eleventh, and 1¼ in. for top story.

What is the riser size for a two-bath apartment six stories high?

Table 3 gives 2 in. for the first four stories with 1½ in. at fifth story and 1¼ in. on the top story.

Example: What is the required size of water main for apartment house eight stories high, six apartments per story, each having three baths?

Answer from Table 4 is 3 in.

Example: What is the required size of main for a ten-story apartment house with six apartments per story, each having two baths?

Answer from Table 4 is 3½-in. main.

Table 5 gives the amount of water in gallons per minute which may be passed through pipes of ¾ in. to 4 in. diameter with pressure drops of from 5 lb. to 150 lb. per 100 ft. of run. This table may be used in sizing horizontal and vertical mains.

For example: If the water main pressure available is known, say 90 lb., and the horizontal run from water main to vertical riser is 100 ft., and the vertical riser is 100 ft. to top branch, it will require 43.31 lb. for static head (see Table 6), and 15 lb. pressure at a minimum should be allowed for the uppermost fixture, or a total of 58.31 lb.; which would leave available for friction 90 - 58.31 = 31.69 for friction in 200-ft. run, or 15.85 lb. per 100 ft. The main can thus be sized from the 20 lb. pressure drop of Table 5.

Example: What are the sizes required for mains and branches in a building 100 ft. high, supplied with a water pressure of 75 lb. per square inch with 100 gal. of water per minute required on each story?

This is worked out in Table 2 and gives the pipe sizes for the main riser with a 10-lb. drop for 100 ft. of run and shows that a 3-in. main, reduced to 2 in. would be required. Branches to the various groups of