

TABLE 9. SCHEDULE OF SIZES FOR DOWN-FEED RISER (SEE FIG. 5)

PORTION ALLOWABLE DROP PER LB PER 100 FT RISER		PROBABLE FLOW, GALLONS PER MINUTE																	
		5	10	15	20	25	30	40	50	60	70	80	90	100	125	150	200	250	
T	3.5	1/4	1	1 1/4	1 1/2	1 3/4	2	2	2 1/4	2 1/2	2 3/4	3	3	3	3	3 1/4	3 1/4	3 1/4	
S	20	1/4	1/4	1	1 1/4	1 1/2	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	2	2	2	2	2 1/4	2 1/4	3	
R	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
Q	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
P	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
O	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
N	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
M	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
L	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
K	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
J	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
I	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
H	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
G	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
F	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
E	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
D	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
C	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
B	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	
A	30	1/4	1/4	1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2 1/4	2 1/4	2 1/4	

FIG. 5. TYPICAL RISER FOR 20-STORY BUILDING

HOT WATER SUPPLY PIPING

The same basic principles used in the design of cold water piping are also applicable to hot water systems. Hot water, like cold water, may be distributed by either up-feed or down-feed systems.

It is common practice to provide circulation in a hot water supply system so that hot water may be quickly available when the faucet is opened. If this is not done, it is necessary to drain all of the cold water

from the lines between the faucet and the heater, before hot water can be obtained.

Three common methods of arranging hot water circulating lines are illustrated in Fig. 6. Although the diagrams are for multi-story buildings, arrangements *a* and *b* are also used frequently in residences.

A check valve should be provided in the runout from each circulating riser to prevent temporary reversal of flow in the line when a faucet is opened.

Proper air venting of a circulated system is extremely important, particularly if gravity circulation is employed. In Fig. 6*a* and 6*b* this is accomplished by connecting the circulating line below the top fixture supply. Air is thus eliminated from the system each time the top fixture is opened. Where an overhead main is located above the highest fixture,

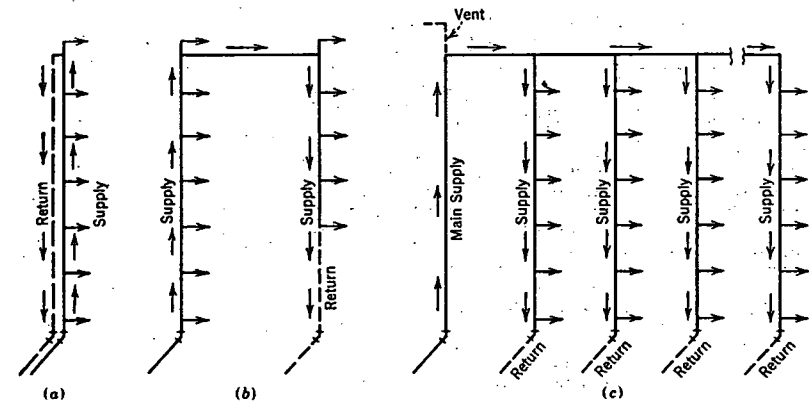


FIG. 6. METHODS OF ARRANGING HOT WATER CIRCULATION LINES

as in Fig. 6*c* an automatic float type air vent is installed at the highest point of the system.

The supply riser in Fig. 6*a* would be sized exactly the same as an up-feed cold water riser. The sizing of Fig. 6*b* and 6*c* would involve calculations for both up-feed and down-feed risers. Pressure loss in the overhead main would have to be considered in sizing the up-feed risers.

The return line for a gravity circulating system should never be less than 3/4 in. Where supply risers are large or lines are long, larger circulating lines may be indicated. Pumps are frequently used in large systems to provide positive circulation.

It is sometimes necessary to make an allowance for pressure drop in the heater when sizing hot water lines. This is particularly true where instantaneous heaters are used.

STORAGE CAPACITY AND HEATING LOAD

In estimating the size of hot water storage tank required and the heating capacity to be provided either from the boiler or from an inde-