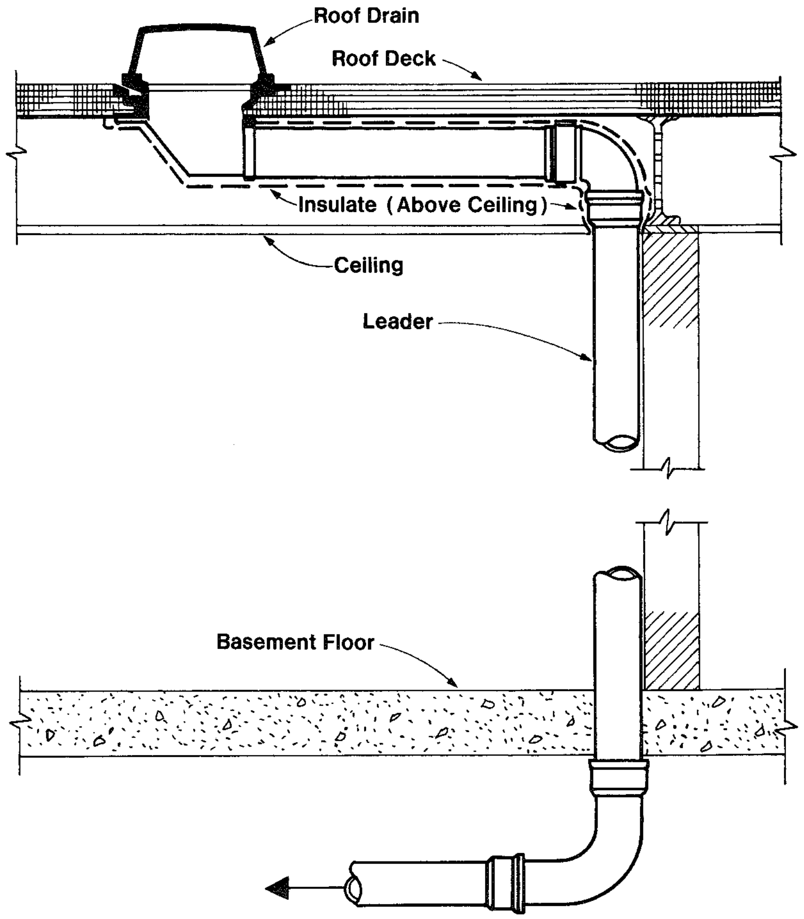
per minute may be obtained by the simple conversion of multiplying 24 by 4 and dividing by the maximum rate of rainfall in inches per hour for that particular locality, i.e.,

4 in./hr. rainfall: 24 sq. ft. = 1 gpm
5 in./hr. rainfall: 24 x 4/5 = 19.2 sq. ft. = 1 gpm
3 in./hr. rainfall: 24 x 4/3 = 32 sq. ft. = 1 gpm.

Figure 7-2—Provision For Expansion And Condensation



Vertical Walls

Many authorities recommend that 50 per cent of the vertical wall area adjacent to a drained area should be added to the horizontal drained area. It is extremely unusual for rain to fall in a perfectly vertical pattern. Depending upon wind conditions, the angle of rainfall could be as much as 60 degrees to the vertical or possibly more. Under this condition, rain falls on the wall and is conducted down and added to the rain falling on the horizontal area to be drained. While this may be theoretically valid, it is the author's opinion that the theory does not hold up under actual conditions. If it were true, there would be such a depth of water on the sidewalks in front of buildings during a storm that people could not walk. Apparently the wind that drives the rain into the wall also whips the rain on the wall, away from the area. More research is required on this subject and the student is advised to follow recommended practice until definitive data can be collected.

Sizing

Table 7-1 is a tabulation of pipe sizes required for leaders and horizontal storm piping in terms of drained areas based upon a maximum 4 inches per hour rainfall rate.

TABLE 7-1
Maximum Permissible Loads for Storm Drainage Piping

Pipe Diam. in.	Leaders Drained area, sq. ft.	Horizontal Piping Drained area, sq. ft., for various slopes 1/8″	1/4″	1/2″
2	720	—	—	—
2½	1300	—	—	—
3	2200	822	1160	1644
4	4600	1880	2650	3760
5	8650	3340	4720	6680
6	13500	5350	7550	10700
8	29000	11500	16300	23000
10		20700	29200	41400
12		33300	47000	66600
15		59500	84000	119000

Roof Gutters

The size of semicircular gutters can be obtained from Table 7-2. Rectangular gutters can be selected on the basis of an equivalent cross-sectional area to the semicircular gutter. Rectangular leaders, because of the four walls and corners, offer greater frictional losses and this diminishes their carrying capacity. To compensate for this loss, a rectangular leader must be about 10 per cent larger than a round leader to convey the same load. Table 7-3 gives the sizes of rectangular leaders which are equivalent to round leaders.