

## Purpose

Roof drainage systems are designed to receive rainwater from the roof by means of a roof drain and convey that water by means of piping to the street level or storm sewer. The storm drainage system should be sized according to the maximum rainfall for a given area.

## Selection

To select a roof drain, the following information must be determined by the engineer:

- Type of roof construction to be used
- Roof Pitch
- Volume of expected rainfall for the areas. (Table 1 )
- Desired rate of discharge
- Roof load and safety overflow requirements
- Size of roof drain (see below)

## Sizing and Quantities

There is a wide difference of opinion among plumbing designers concerning the sizing and placement of roof drains in different geographical areas! Some areas have local codes governing roof drain sizing. Some authorities use the roof area in horizontal projection related to the cross sectional area of the vertical leaders for the number and size of roof drains. (**Note:** This method disregards the rate and amount of precipitation.) Others have adopted the sizing method recommended by the National Plumbing Code. This code along with the United States Weather Bureau rainfall charts provides the best available data for roof drain sizing. In case of doubt, the local board's opinion should prevail. Using the National Plumbing Code sizing procedures and using Tyler, Texas as an example, the following steps should be used.

Step	Example
(1) Calculate the total roof area. (See Reference A-F)	(1) Using a building with a roof 400' x 200', total roof area = 80,000 square feet.
(2) Determine from Table 1 the maximum hourly rainfall.	(2) Maximum hourly rainfall for Tyler is 3.24 inches.
(3) If the maximum hourly rainfall is fractional carry to the next highest whole number.	(3) For figuring purposes round up 3.24 inches to 4"
(4) Select leader size.	(4) After studying building plan and physical set up assume that 4" leaders are desired.
(5) From Table 2 determine the number of square feet that can be drained by one roof leader at the maximum hourly rainfall rate (Step 2).	(5) From Table 2 - one 4" leader at 4" rate of rainfall will drain 4,600 sq. ft. of area.
(6) Divide the total roof area (Step 1) by the area one leader (Step 5) will drain. This result is the number of roof drains required for the building. If result is fractional carry to the next higher number.	(6) Number of roof drains required equals 80,000 sq. ft. divided by 4,600 ft. or 18 roof drains.

**NOTE:** If other leader sizes were desired, the total number of roof drains would increase or decrease proportionally i.e. 37-3", 10-5" or 6-6". We recommend that leaders be spaced no more that 75' apart, and 3" minimum diameter.

**Reference A-F:** Where vertical walls project above the roof to permit storm water to drain to the roof area below, the adjacent roof area may be computed as follows:

- (A) One Wall- add 50% of the total wall area to the roof area figures.
- (B) Two Adjacent Walls - add 35% of the total wall areas.
- (C) Two Walls opposite of same height - add no additional area.
- (D) Two Walls opposite of different heights - add 50% of wall area above top or lower wall.
- (E) Walls on Three sides - add 50% of area of the inner wall below the top of the lowers wall, plus allowance for area of wall above top of lowest wall per (B) and (D).
- (F) Wall on Four sides, no allowance for wall areas below top of lowest wall - add for areas above top of lowest wall per (A), (B), (D) and (E).