

CHAPTER 11

STORM DRAINAGE

1101 GENERAL

1101.1 Scope

The provisions of this chapter shall govern the materials, design, construction, and installation of storm drainage.

1101.2 Drainage Required

Roofs, paved areas, yards, courts and courtyards shall be drained into a storm sewer system.

1101.3 Prohibited Drainage

Storm water shall not be drained into sewers intended for sewage only.

1101.4 Expansion Joints

Expansion joints or sleeves shall be provided where warranted by temperature variations or physical conditions.

1101.5 Subsoil Drains

Where subsoil drains are placed under the cellar or basement floor or are used to surround the outer walls of a building, they shall be made of open-jointed or horizontally split or perforated clay tile, asbestos cement pipe, or plastic pipe meeting the requirements of Table 703, not less than 4-inch diameter. When the building is subject to backwater, the subsoil drain shall be protected by an accessibly located backwater valve. Subsoil drains may discharge into a properly trapped area drain or sump. Such sumps do not require vents.

1101.6 Building Subdrains

Building subdrains located below the public sewer level shall discharge into a sump or receiving tank, the contents of which shall be automatically lifted and discharged into the drainage system as required for building sumps.

1101.7 Pumping System

Pumping systems installed to remove contents of collecting sumps shall include the sump pump, pit, and discharge piping as defined below.

1. Sump Pump: An automatic water pump for the removal of drainage from a sump, pit, or low point in a residential, commercial, or industrial property shall be of a capacity and head appropriate to anticipated use requirements.
2. Sump Pit: Size shall be not less than 18-inch (457 mm) diameter and may be constructed of tile, steel, plastic, cast iron, concrete, or other material accepted by the plumbing official, topped by a removable cover adequate to support anticipated loads in area of use. The pump floor shall provide permanent support for the pump.
3. Electrical service outlets, when required, shall meet the requirements of NFPA 70 or local codes.

4. Discharge piping shall meet the requirements of 1103.1, 1103.2, 1103.3 or 1103.4 and shall include a gate valve and a full flow check valve. Size and fittings shall be the same size as, or larger than, pump discharge tapping.

1101.8 Backwater Devices

The installation of backwater devices as protection for fixtures subject to backflow shall be in accordance with requirements of this code.

1101.9 Tests

The interior leaders and downspouts system shall be tested in accordance with 311.5.

1102 DEFINITIONS

1102.1 The following definition has been deleted without substitution: COMBINED BUILDING SEWER.

1102.2 The following definitions have been moved to Chapter 2: AREA DRAIN, BUILDING STORM DRAIN, CONDUCTOR, LEADER, SANITARY SEWER.

1103 MATERIALS

1103.1 Inside Conductors Including Above Ground Storm Drains

Conductors placed within buildings or run in vent or pipe shafts shall be aluminum, cast iron, galvanized or black steel, galvanized ferrous alloys, brass, copper tubing of a weight not less than that of copper drainage tube Type DWV, copper pipe or schedule 40 plastic pipe.

1103.2 Building Storm Drains

All building storm drains shall be of materials required for building drains in Sections 703.3 and 703.4.

1103.3 Underground Building Storm Drains

Underground building storm drains, inside the building perimeter, shall be of cast iron soil pipe, ferrous-alloy piping, copper tube Type DWV, or Schedule 40 plastic piping.

1103.4 Building Storm Sewers

The building storm sewer shall be of cast iron soil pipe, vitrified-clay pipe, concrete pipe, or plastic pipe meeting the requirements of Table 703.

1104 SPECIFICATIONS

Pipe, tubing, and fittings for storm drainage systems shall conform to the standards listed in Table 703.

1106 CONDUCTORS AND CONNECTIONS

1106.2 Protection

Rain water conductors installed along alleyways, driveways, or other locations where they may be exposed to damage shall be protected.

1106.3 Separation of Storm Drainage from Sanitary Sewers

The sanitary sewer and storm drainage systems of a building shall be entirely separate.

1106.4 Floor Drains

Floor drains shall not be connected to a storm drain.

1107 ROOF DRAINS

1107.1 Material

Roof drains shall be of an approved corrosion resistant material with adequate strainer area and shall comply with the applicable standards in Table 303.

1107.2 Strainers

When roof drains are provided they shall have strainers extending not less than 4 inches (102 mm) above the surface of the roof immediately adjacent to the roof drain. Strainers shall have an available inlet area, above roof level, of not less than one and one-half times the area of the conductor or leader to which the drain is connected.

1107.3 Flat Decks

Roof drain strainers for use on sun decks, parking decks, and similar areas, normally serviced and maintained, may be of the flat surface type, level with the deck and shall have an available inlet area not less than two times the area of the conductor or leader to which the drain is connected.

1107.4 Roof Drain Flashings

The connection between roofs and roof drains which pass through the roof and into the interior of the building shall be made watertight by the use of proper flashing material.

1108 SIZE OF LEADERS AND STORM DRAINS

1108.1 Vertical Leaders

Vertical leaders shall be sized for the maximum projected roof area, according to Table 1108.1.

Table 1108.1 Size of Vertical Leaders

Size of Leader or Conductor ¹ (in)	Maximum Projected Roof Area (sq ft)
2	720
2 1/2	1300
3	2200
4	4600
5	8650
6	13,500
8	29,000

¹ 1 in = 25.4 mm, 1 ft² = 0.0929 m²

Note:

1. The equivalent diameter of square or rectangular leader may be taken as the diameter of that circle which may be inscribed within the cross-sectional area of the leader. See 1108.2.2.

1108.2 Building Storm Drains

1108.2.1 The size of the building storm drain or any of its horizontal branches having a slope of 1/2 inch or less per foot (41.6 mm/m) shall be based upon the maximum projected roof area to be handled according to Table

Table 1108.2 Size of Horizontal Storm Drains

Diameter of Drain (in)	Maximum Projected Roof Area for Drains of Various Slopes (sq ft)		
	1/8 In Slope	1/4 In Slope	1/2 In Slope
3	822	1,160	1,644
4	1,880	2,650	3,760
5	3,340	4,720	6,680
6	5,350	7,550	10,700
8	11,500	16,300	23,000
10	20,700	29,200	41,400
12	33,300	47,000	66,600
15	59,500	84,000	119,000

1 in = 25.4 mm

1 ft² = 0.0929 m²

1108.2.2 Tables 1108.1 and 1108.2 are based upon a rate of rainfall of 4 inches (102 mm) per hour. If in any state, city or other political subdivision, the maximum rate of rainfall is more or less than 4 inches (102 mm) per hour, then the figures for roof area shall be adjusted proportionately by dividing the figure by four and multiplying by the maximum rate of rainfall in inches (mm) per hour. See 1108.4.

1108.3 Vertical Walls

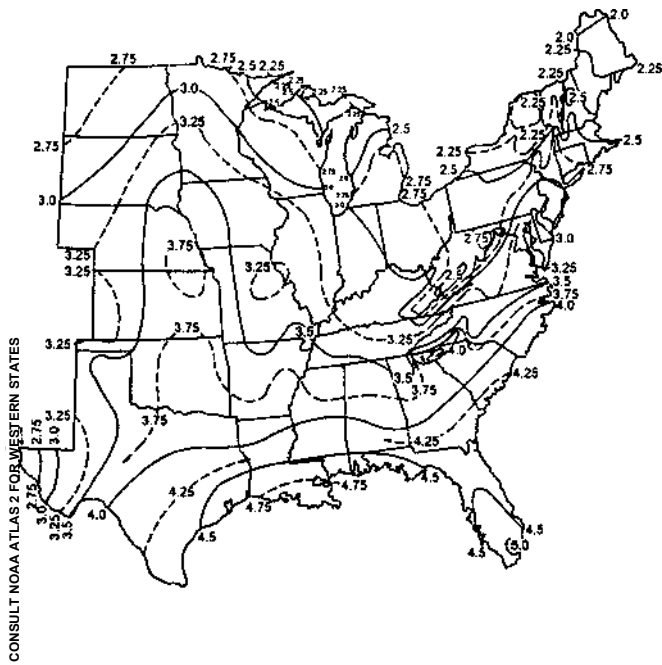
In sizing roof drains and storm drainage piping, one-half of the area of any vertical wall which diverts rain water to the roof shall be added to the projected roof area for inclusion in calculating the required size of vertical leaders and horizontal storm drainage piping.

1108.4 Maximum Rates of Rainfall

Primary roof drain systems shall be designed using Tables 1108.1 and 1108.2 adjusted in accordance with 1108.2.2 for the local rainfall for a 60 minute duration and a 100 year return period in Figure 1108.4. The plumbing official may approve local weather data on the maximum rate of rainfall when available.

1108.5 Parapet Wall Scupper Location

See the Standard Building Code for parapet wall roof drainage scupper and overflow scupper location requirements.



LEGEND
 100-YEAR 60-MINUTE PRECIPITATION (INCHES)
 FROM NOAA/NWS HYDRO - 35
 * KEY WEST, FLORIDA VALUE REPRESENTATIVE FOR FLORIDA KEYS

FIGURE 1108.4
RAINFALL RATES FOR PRIMARY ROOF DRAINS (IN/HR)

1109 SECONDARY (EMERGENCY) ROOF DRAINS

1109.1 Secondary Drainage Required

Secondary (emergency) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water would be entrapped should the primary drains allow buildup for any reason.

1109.2 Separate Systems Required

Secondary roof drain systems shall have piping and point of discharge separate from the primary system. Discharge shall be above grade in a location which would normally be observed by the building occupants or maintenance personnel.

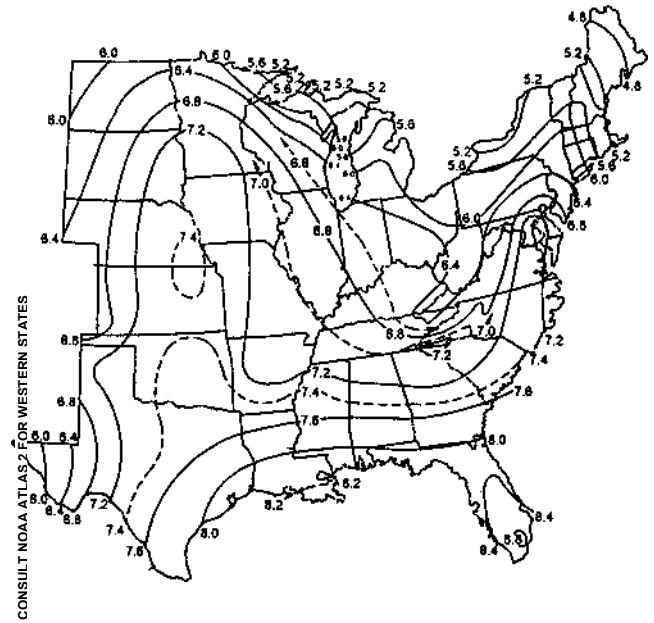
1109.3 Maximum Rainfall Rate for Secondary Drains

Secondary (emergency) roof drain systems or scuppers shall be sized based on the flow rate caused by the 100 year 15 minute precipitation as indicated in Figure 1109.3. The flow through the primary system shall not be considered when sizing the secondary roof drain system.



1111 VALUES FOR CONTINUOUS FLOW

Where there is a continuous or semicontinuous discharge into the building storm drain or building storm sewer, as from a pump, ejector, air conditioning plant, or similar device, each gallon per minute of such discharge shall be computed as being equivalent to 24 sq ft (2.23 m²) of roof area, based upon a 4-inch (102 mm) rainfall.



LEGEND
 7.24"
 BASED ON 100-YEAR 15-MINUTE PRECIPITATION (INCHES)
 FROM NOAA/NWS HYDRO - 35
 * KEY WEST, FLORIDA VALUE REPRESENTATIVE FOR FLORIDA KEYS

FIGURE 1109.3
RAINFALL RATES FOR
SECONDARY ROOF DRAINS (IN/HR)



1113 APPENDIX REFERENCES

Additional provisions for storm drainage are found in Appendix A - Roof Drain Sizing Method. These provisions are applicable only where specifically included in the body of the code sections or in the adopting ordinance.



