

4. Scuppers shall be sized as rectangular weirs, using hydraulic principles to determine the required length and resulting overflow head (see Appendix A). Secondary roof drains and standpipes shall be sized according to Table 13.6.1 Where standpipes are used, the head allowance required under Section 13.1.10.2(3) shall be not less than 1-1/2 inches.

5. Strainers shall not be required on open standpipes when used for secondary inlets.

#### **13.1.10.3 Vertical Walls**

Where vertical walls drain onto roofs, an allowance based on 50% of the maximum projected wall area shall be added to the roof area onto which each wall drains.

#### **13.1.10.4 Equivalent Systems**

When approved by the Administrative Authority, the requirements of Sections 13.1.10.1 and 13.1.10.2 shall not preclude the installation of an engineered roof drainage system that has sufficient capacity to prevent water from ponding on the roof in excess of that allowed in the roof structural design during a 100-year, 15-minute storm.

#### **13.1.11 Continuous Flow**

Where continuous flow from a spring or ground water is encountered in a foundation drainage system or other subsoil drain, the discharge shall be piped to a storm sewer or approved water course.

#### **13.1.12 Backwater Valves**

Where foundation drains, areaway drains, window well drains, or other storm water drains discharge by gravity and are subject to backflow from their point of discharge, a backwater valve shall be provided in the discharge line. Backwater valves shall comply with the requirements of Section 5.5.

### **13.2 MATERIALS**

See Section 3.7.

### **13.3 TRAPS IN STORM DRAINAGE SYSTEMS**

#### **13.3.1 General**

a. Traps shall be installed in a storm drainage system if it connects to a combined sewer conveying both sewage and storm water.

EXCEPTION: Traps shall not be required where roof drains, rain leaders, and other inlets are at locations allowed under Section 12.4.4 for vent terminals.

b. Floor drains or other receptors shall be individually trapped if they are connected to a storm drainage system, regardless of whether or not the sewer is combined.

c. Traps required under this section shall comply with the requirements of Section 5.3.1, 5.3.2, 5.3.3, and 5.3.5. Traps shall have accessible cleanouts or other means of clearing the trap.

NOTE: FLOOR DRAINS WHICH ARE CONNECTED TO STORM OR COMBINATION SYSTEMS AND WHICH ARE SUBJECTED TO EVAPORATION SHALL HAVE AT LEAST A 4" SEAL OR SHALL BE PROVIDED WITH A METHOD OR DEVICE TO MAINTAIN SEAL INTEGRITY. FREEZE PROTECTION SHALL ALSO BE PROVIDED AS PER SECTION 5.3.3.

#### **13.3.2 Location of Traps**

Where traps are required under Section 13.3.1.a, they shall be installed either on individual branches of the storm drainage system or in the building storm drain or building storm sewer before it connects to the combined sewer. Traps shall not be installed in locations where they will be subject to freezing. Where traps are required for rain leaders, the minimum earth cover shall be as required in Section 2.16.b.

See Figures 13.3.2 and 1.2.16 and Section 13.4.3

**1106.4 Vertical walls.** In sizing roof drains and storm drainage piping, one-half of the area of any vertical wall that diverts rainwater to the roof shall be added to the projected roof area for inclusion in calculating the required size of vertical conductors, leaders and horizontal storm drainage piping.

**1106.5 Parapet wall scupper location.** Parapet wall roof drainage scupper and overflow scupper location shall comply with the requirements of the *International Building Code*.

**1106.6 Size of roof gutters.** The size of semicircular gutters shall be based on the maximum projected roof area in accordance with Table 1106.6.

## SECTION 1107 SECONDARY (EMERGENCY) ROOF DRAINS

**1107.1 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 will be entrapped if the primary drains allow buildup for any reason.

**1107.2 Separate systems required.** Secondary roof drain systems shall have the end point of discharge separate from the primary system. Discharge shall be above grade, in a location that would normally be observed by the building occupants or maintenance personnel.

**TABLE 1106.6  
SIZE OF SEMICIRCULAR ROOF GUTTERS**

DIAMETER OF GUTTERS (inches)	HORIZONTALLY PROJECTED ROOF AREA (square feet)					
	Rainfall rate (inches per hour)					
	1	2	3	4	5	6
$\frac{1}{16}$ unit vertical in 12 units horizontal (0.5-percent slope)						
3	680	340	226	170	136	113
4	1,440	720	480	360	288	240
5	2,500	1,250	834	625	500	416
6	3,840	1,920	1,280	960	768	640
7	5,520	2,760	1,840	1,380	1,100	918
8	7,960	3,980	2,655	1,990	1,590	1,325
10	14,400	7,200	4,800	3,600	2,880	2,400
$\frac{1}{8}$ unit vertical 12 units horizontal (1-percent slope)						
3	960	480	320	240	192	160
4	2,040	1,020	681	510	408	340
5	3,520	1,760	1,172	880	704	587
6	5,440	2,720	1,815	1,360	1,085	905
7	7,800	3,900	2,600	1,950	1,560	1,300
8	11,200	5,600	3,740	2,800	2,240	1,870
10	20,400	10,200	6,800	5,100	4,080	3,400
$\frac{1}{4}$ unit vertical in 12 units horizontal (2-percent slope)						
3	1,360	680	454	340	272	226
4	2,880	1,440	960	720	576	480
5	5,000	2,500	1,668	1,250	1,000	834
6	7,680	3,840	2,560	1,920	1,536	1,280
7	11,040	5,520	3,860	2,760	2,205	1,840
8	15,920	7,960	5,310	3,980	3,180	2,655
10	28,800	14,400	9,600	7,200	5,750	4,800
$\frac{1}{2}$ unit vertical in 12 units horizontal (4-percent slope)						
3	1,920	960	640	480	384	320
4	4,080	2,040	1,360	1,020	816	680
5	7,080	3,540	2,360	1,770	1,415	1,180
6	11,080	5,540	3,695	2,770	2,220	1,850
7	15,600	7,800	5,200	3,900	3,120	2,600
8	22,400	11,200	7,460	5,600	4,480	3,730
10	40,000	20,000	13,330	10,000	8,000	6,660

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>.



**1105.1.2** Roof drains shall be of cast iron, copper or copper alloy, lead, or plastic.

**1105.2 Dome or Strainer for General Use.** All roof drains and overflow drains, except those draining to hanging gutters, shall be equipped with strainers extending not less than four (4) inches (102 mm) above the surface of the roof immediately adjacent to the drain. Strainers shall have a minimum inlet area above the roof level of not less than one and one-half (1-1/2) times the area of the conductor or leader to which the drain is connected.

**1105.3 Strainers for Flat Decks.** Roof drain strainers for use on sun decks, parking decks, and similar areas that are normally serviced and maintained may be of the flat surface type. Such roof drain strainers shall be level with the deck and shall have an available inlet area of no less than two (2) times the area of the conductor or leader to which the drain is connected.

**1105.4 Roof Drain Flashings.** Connection between the roof and roof drains that pass through the roof and into the interior of the building shall be made watertight by the use of proper flashing material.

**1105.4.1** Where lead flashing material is used, it shall be a minimum of four (4) pounds per square foot (19.5 kg/m<sup>2</sup>).

**1105.4.2** Where copper flashing material is used, it shall be a minimum of twelve (12) ounces per square foot (3.7 kg/m<sup>2</sup>).

#### **1106.0 Size of Leaders, Conductors, and Storm Drains.**

**1106.1 Vertical Conductors and Leaders.** Vertical conductors and leaders shall be sized on the basis of the maximum projected roof area and Table 11-1.

**1106.2 Size of Horizontal Storm Drains and Sewers.** The size of building storm drains or building storm sewers or any of their horizontal branches shall be based upon the maximum projected roof or paved area to be handled and Table 11-2.

**1106.3 Size of Roof Gutters.** The size of semi-circular gutters shall be based on the maximum projected roof area and Table 11-3.

**1106.4 Side Walls Draining onto a Roof.** Where vertical walls project above a roof so as to permit storm water to drain to the roof area below, the adjacent roof area may be computed from Table 11-4 as follows:

- (1) For one (1) wall – add fifty (50) percent of the wall area to the roof area figures.
- (2) For two (2) adjacent walls – add thirty-five (35) percent of the total wall areas.
- (3) Two (2) opposite walls of same height – add no additional area.

- (4) Two (2) opposite walls of differing heights – add fifty (50) percent of the wall area above the top of lower wall.
- (5) Walls on three (3) sides – add fifty (50) percent of the area of the inner wall below the top of the lowest wall, plus allowance for the area of the wall above the top of the lowest wall, per (2) and (4) above.
- (6) Walls on four (4) sides – no allowance for wall areas below the top of the lowest wall – add for areas above the top of the lowest wall per (1), (2), (4), and (5) above.

#### **1107.0 Values for Continuous Flow.**

Where there is a continuous or semi-continuous discharge into the building storm drain or building storm sewer, as from a pump, ejector, air-conditioning plant, or similar device, one (1) gpm (3.8 L/min.) of such discharge shall be computed as being equivalent to twenty-four (24) square feet (2.2 m<sup>2</sup>) of roof area, based upon a rate of rainfall of four (4) inches (102 mm) per hour.

#### **1108.0 Controlled-Flow Roof Drainage.**

**1108.1 Application.** In lieu of sizing the storm drainage system in accordance with Section 1106.0, the roof drainage may be sized on the basis of controlled flow and storage of the storm water on the roof, provided the following conditions are met:

- (1) The water from a 25-year-frequency storm shall not be stored on the roof for more than twenty-four (24) hours.
- (2) During the storm, the water depth on the roof shall not exceed the depths specified in Table 11-4.

**TABLE 11-4**  
**Controlled-Flow Maximum Roof Water Depth**

Roof Rise,*		Max Water Depth at Drain,	
Inches	(mm)	Inches	(mm)
Flat	(Flat)	3	(76)
2	(51)	4	(102)
4	(102)	5	(127)
6	(152)	6	(152)

\*Vertical measurement from the roof surface at the drain to the highest point of the roof surface served by the drain, ignoring any local depression immediately adjacent to the drain.

- (3) No less than two (2) drains shall be installed in roof areas of ten thousand (10,000) square feet (929.0 m<sup>2</sup>) or less, and no less than one (1) additional drain shall be installed for