APPENDIX A
ROOF DRAIN SIZING METHOD

(APPENDIX A IS FOR INFORMATIONAL PURPOSES ONLY)

A101 Sizing Example

The following example gives one method of sizing the primary drain system and sizing the scuppers in the parapet walls. This method converts the roof area to an equivalent roof area for a 4-inch rate of rainfall so that Table 1108.1 and Table 1108.2 can be used as printed. The method described in 1108.2.2 converts Table 1108.1 and Table 1108.2 to tables for the rate of rainfall specified for the area.

A101.1 Problem: Given the roof plan in Figure A101.1 and the site location in Birmingham, Alabama, size the primary roof drain system and size the scuppers, denoting the required head of water above the scupper for the structural engineer.

Note: For the purposes of this appendix the following metric conversions are applicable: 1 in = 25.4 mm 1 ft = 305 mm 1 ft2 = 0.0929 m2

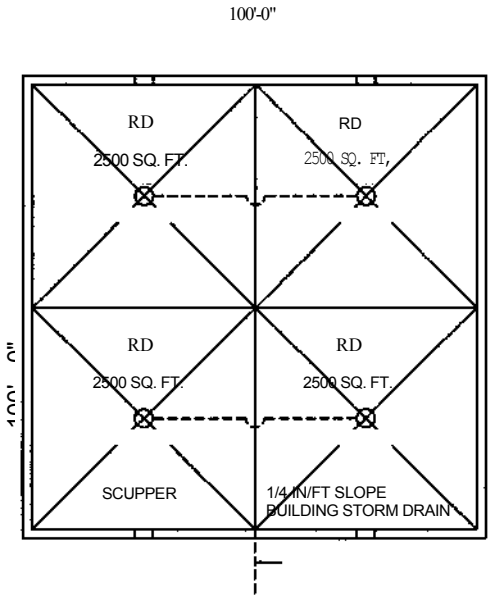

Figure A101.1
Example Roof Plan

A 101.2 Solution:

Step 1. From Figure 1108.4 the 100 year 60 minute precipitation is 3.75 inches per hour.

Step 2. Each vertical drain must carry 2,500 sq ft of roof area at 3.75 inches per hour of rainfall. To convert to an area for a 4 inch per hour rainfall to enter Table 1108.1 do this:

2,500 ÷ 4 x 3.75 = 2,344 sq ft.

Enter Table 1108.1 until you find a diameter pipe that will carry 2,344 sq ft. A minimum 4-inch vertical drain is required.

Step 3. Horizontal Drain

2,500 sq ft.

To convert to an area for use in Table 1108.2 do this:

2,500 ÷ 4 x 3.75 = 2,344 sq ft

Enter Table 1108.2 until you find a diameter pipe that will carry 2,344 sq ft. A minimum 4-inch diameter pipe with a 1/4 inch per foot slope will carry 2,650 sq ft. A minimum 4-inch diameter drain on a 1/4 inch per foot slope is required.

Step 4. Horizontal Drain

5,000 sq ft.

To convert to an area for use in Table 1108.2 do this:

5,000 ÷ 4 x 3.75 = 4,688 sq ft.

Enter Table 1108.2 until you find a diameter pipe that will carry 4,688 sq ft. A 5-inch diameter pipe with a 1/4 inch per foot slope will carry 4,720 sq ft. A minimum 5-inch diameter drain on a 1/4 inch per foot slope is required.

Step 5. Horizontal Drain

10,000 sq ft.

To convert to an area for use in Table 1108.2 do this:

10,000 ÷ 4 x 3.75 = 9,375 sq ft.

Enter Table 1108.2 until you find a diameter pipe that will carry 9,375 sq ft. An 8-inch diameter pipe on 1/4 inch per foot slope will carry 16,300 sq ft but a 6-inch will carry only 7,550 sq ft, therefore, use an 8-inch diameter drain on a 1/4 inch per foot slope.

Step 6. From Figure 1109.3 the rate caused by a 100 year 15 minute precipitation is 7.2 inches per hour. The scuppers must be sized to carry the flow caused by a rain fall rate of 7.2 inches per hour.

Step 7. Each scupper is draining 2,500 sq ft of roof area. To convert this roof area to an area for use with Table A101.2 do this:

2,500 ÷ 4 x 7.2 = 9,375 sq ft = 4,500 sq ft. Enter Table A101.2 to find a length and head that will carry 4,500 sq ft or more. From Table A101.2 a 12-inch wide weir with a 4-inch head carries 6,460 sq ft. Use 12-inch wide x 5-inch high scuppers at four locations. A height of 5 inches is needed to assure an open area above the 4-inch head.

Step 8. Notify the structural engineer that the design of the roof structure must account for a height of water to the scupper entrance elevation plus 4 inches for the required head to cause design flow.

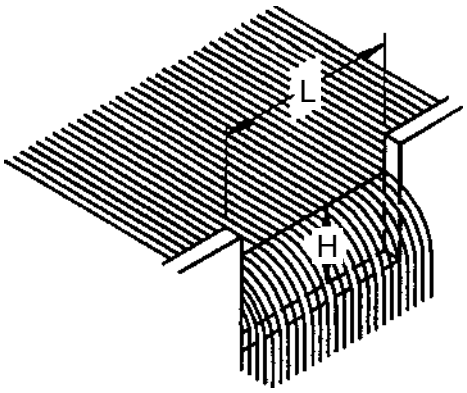

Figure A101.2

Table A101.2
Scupper Sizing Table
Roof Area (sq ft)

Head (H) Inches	Length (L) of Weir (Inches)						
	4	**6**	**8**	**12**	**16**	**20**	**24**
1	273	418	562	851	1,139	1,427	1,715
2	734	1,141	1,549	2,365	3,180	3,996	4,813
3	1,274	2,023	2,772	4,270	5,768	7,267	8,766
4	1,845	2,999	4,152	6,460	8,766	11,073	13,381
6	2,966	5,087	7,204	11,442	15,680	19,918	24,160

Note:
Table based on rainfall of 4 inches per hour.