

Roof Runoff Management (No.) 558

DEFINITION

A facility for collecting, controlling, and disposing of runoff water from roofs.

PURPOSES

To prevent roof runoff water from flowing across concentrated waste areas, barnyards, roads, and alleys; and to reduce pollution and erosion, improve water quality, prevent flooding, improve drainage, and protect the environment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where: (1) a roof runoff management facility is included in an overall plan for a waste management system; (2) roof runoff water may come in contact with wastes or cause soil erosion; and (3) barnyard flood protection or improved drainage is needed.

CRITERIA

Capacity

Design of roof runoff management facilities shall be based on the runoff from a 10-year frequency, 5-minute rainfall; except that a 25-year frequency, 5-minute rainfall shall be used to design such facilities for exclusion of roof runoff from waste treatment lagoons, waste storage ponds, or similar practices. Rainfall from Figures 1 and 2 or reliable local records may be used for design. The facility shall be designed to pass the peak flow using Manning's equation with an "n" value of 0.012.

Materials

Roof gutters and downspouts may be made of aluminum, galvanized steel, wood, or plastic. Aluminum gutters and downspouts shall have a nominal thickness of at least 0.07 and 0.05 cm (0.027 and 0.020 in) respectively. Galvanized steel gutters and downspouts shall be at least 28 gage. Wood shall be clear and free of knots. A water-repellent

preservative shall be applied to the flow area of wood other than redwood, cedar, or cypress. Plastics shall contain ultraviolet stabilizers. Dissimilar metals shall not be in contact with each other.

Supports

Gutter supports shall have sufficient strength to withstand anticipated water, snow, and ice loads. They shall have a maximum spacing of 120 cm (48 in) for galvanized steel and 81 cm (32 in) for aluminum or plastic. Wood gutters shall be mounted on fascia boards using furring blocks that are a maximum of 61 cm (24 in) apart. Downspouts shall be securely fastened at the top and bottom with intermediate supports that are a maximum of 3 m (10 ft) apart.

Outlets

The water from roof runoff management facilities may empty into surface drains or underground outlets, or onto the ground surface. When downspouts empty onto the ground surface, there shall be an elbow to direct water away from the building and splash blocks or other protection shall be provided to prevent erosion.

Protection

Roof runoff management facilities and outlets shall be protected from damage by livestock and equipment. Where appropriate, snow and ice guards may be installed on roofs to protect gutters and reduce the hazard to humans and animals below. Gutters may be installed below the projection of the roof line to further reduce gutter damage from snow and ice.

CONSIDERATIONS

Avoid discharging outlets near wells or into structures that discharge directly into surface waters.

PLANS AND SPECIFICATIONS

Plans and specifications for installing roof runoff management facilities shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Support data documentation requirements are as follows:

- Inventory and evaluation records
 - CONS-6 notes or special report

- Survey notes, where applicable
 - Design survey
 - Construction layout survey
 - Construction check survey
- Design records
 - Physical data, functional requirements, and site constraints, where applicable
 - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
 - Location map
 - “Designed by” and “Checked by” names or initials
 - Approval signature
 - Job class designation
 - Initials from preconstruction conference
 - As-built notes
- Construction inspection records
 - CONS-6 notes or separate inspection records
 - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design. The plan shall contain, but not be limited to, the following provisions:

- Keep roof runoff structures clean and free of obstructions that reduce flow.
- Make regular inspections and perform repair maintenance as needed to ensure proper functioning of the roof runoff structures.

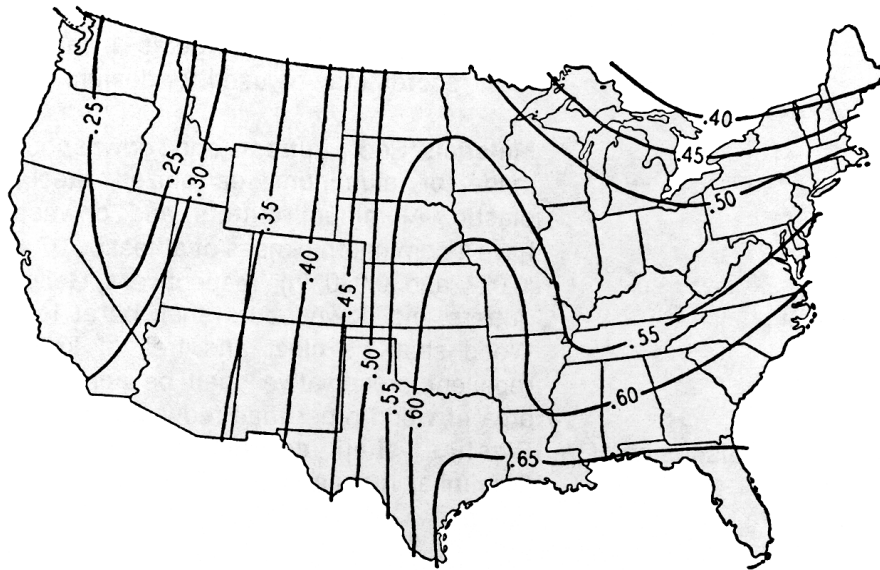


Figure 1.—Ten-year frequency, five-minute rainfall (inches).

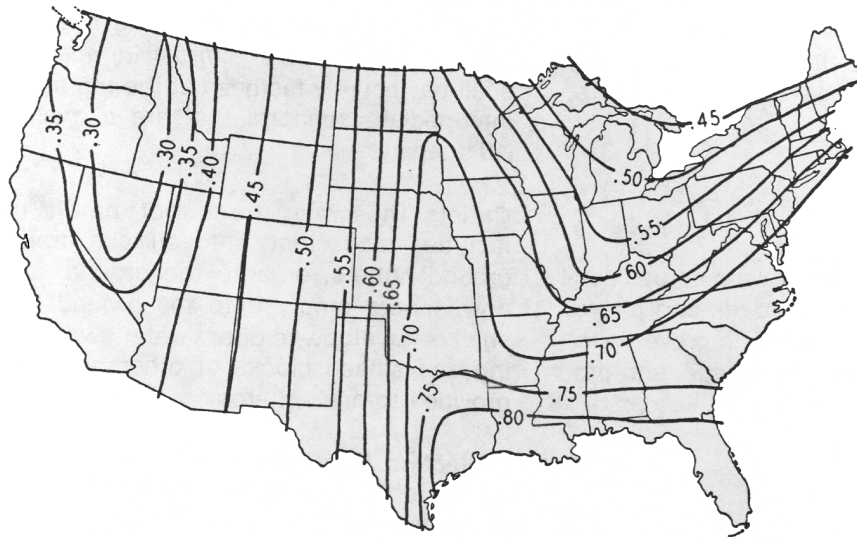


Figure 2.—Twenty-five-year frequency, five-minute rainfall (inches).

Example: Roof Area = 50 ft x 100 ft = 5,000 ft² (Clinton County, Michigan)
10-year, 5-minute rainfall = 0.5 in
Total runoff = 0.5 in x 1 ft/12 in x 5,000 ft² = 208.3 ft³
Duration of rainfall in seconds = 5 min x 60 sec/1 min = 300 sec
Design discharge for gutter = 208.3 ft³/300 sec = 0.69 ft³/sec