

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

ROOF RUNOFF STRUCTURE

(No.)

CODE 558

DEFINITION

Structures that collect, control, and transport precipitation from roofs.

PURPOSES

This practice may be applied as a part of a resource management system to support one or more of the following purposes:

- Improve water quality;
- Reduce soil erosion;
- Increase infiltration;
- Protect structures;
- Increase water quantity.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Roof runoff structures are a component of an overall resource management system;
- Roof runoff needs to be diverted away from structures or contaminated areas;
- There is a need to collect, control, and transport runoff from roofs to a stable outlet;
- Roof runoff is collected and used for other purposes.

CRITERIA

General Criteria Applicable To All Purposes

Laws and Regulations. This practice must conform to all federal, state, and local laws and regulations.

Design Capacity. At a minimum, the 10-year frequency, 5-minute rainfall precipitation event

shall be used to design roof runoff structures, except where excluding roof runoff from manure management systems. In that case, a 25-year frequency, 5-minute precipitation event shall be used to design roof runoff structures (refer to Agricultural Waste Management Field Handbook, National Engineering Handbook, Part 651, Appendix 10B). When gutters are used, the capacity of the downspout(s) (including entrance) must equal or exceed the gutter flow rate.

Outlets. Runoff may empty into surface or underground outlets, or onto the ground surface. Surface and underground outlets shall be sized to ensure adequate design capacity and shall provide for clean-out as appropriate. When runoff from roofs empties onto the ground surface, a stable outlet shall be provided. When runoff is conveyed through a gutter and downspout system, an elbow and energy dissipation device shall be placed at the end of the downspout to provide a stable outlet. Direct runoff away from structure foundations to avoid wetness and hydraulic loading. Outlets must not discharge near wells, septic system drain fields, basements, or buried tanks. Discharge runoff a minimum of five feet from the structure, and slope the discharge area away from the structure.

Surface or ground outlets such as rock pads, rock filled trenches with subsurface drains, concrete and other erosion-resistant pads, or preformed channels may be used, particularly where snow and ice are a significant load component on roofs.

Any underground outlets which are connected to perforated tile or drain field type systems could be considered Class V injection wells subject to regulation by the United States Environmental Protection Agency. Compliance with these regulations is required for this type of outlet.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#), or visit the [electronic Field Office Technical Guide](#).

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Supports. Guards and sufficient supports to withstand the anticipated snow, ice, and other design loads shall be included.

Materials. Roof runoff structures shall be made of durable materials with a minimum design life of ten years. Roof gutters and downspouts may be made of aluminum, galvanized steel, wood, or plastic. Aluminum gutters and downspouts shall have a nominal thickness of 0.027 inches and 0.020 inches, respectively. Galvanized steel gutters and downspouts shall be at least 28 gauge. Wood shall be clear and free of knots. Wood may be redwood, cedar, cypress, or pressure treated wood. Plastics shall contain ultraviolet stabilizers. Dissimilar metals shall not be in contact with each other.

Rock-filled trenches and pads shall consist of poorly graded rock (all rock fragments approximately the same size) and be free of appreciable amounts of sand and/or soil particles. Crushed limestone shall not be used for backfill material unless it has been washed. Subsurface drains or outlets shall meet the material requirements of the applicable Natural Resources Conservation Service (NRCS) conservation practice standard.

Concrete appurtenances used shall meet the requirements of NRCS Construction Specification 32, Concrete for Minor Structures.

Protection. Roof runoff structures shall be protected from damage by livestock and equipment.

Additional Criteria To Increase Infiltration

Runoff shall be routed onto pervious landscaped areas (e.g., lawns, mass planting areas, infiltration trenches, and natural areas) to increase infiltration of runoff. These areas shall be capable of infiltrating the runoff in such a way that replenishes soil moisture without adversely affecting the desired plant species.

Additional Criteria To Increase Water Quantity

Structures needed to collect and store water from roofs for potable and non-potable purposes shall be designed and installed in accordance with sound engineering principles. Storage structures for non-potable purposes such as irrigation water should be designed in

accordance with NRCS conservation practice standards, as appropriate.

Potable water storage structures should be constructed of materials and in a manner that will not increase the contamination of the stored water. The use of pressure treated wood components for any portion of the collection or storage system shall be avoided if water is to be used for livestock or human consumption. Roof runoff collected and stored for potable uses must be treated prior to consumption and should be tested periodically to assure that adequate quality is maintained for human consumption.

CONSIDERATIONS

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

PLANS AND SPECIFICATIONS

Plans and specifications for installing roof runoff structures shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans and specifications shall show the location, spacing, size, and grade of all items to be constructed along with the type and quality of materials to be used. Plans and specifications for other practices essential to the proper functioning of the roof runoff structure, such as underground outlet, shall be included.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, 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 repairs and maintenance as needed to ensure proper functioning of the roof runoff structures.