

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD AND SPECIFICATIONS**

**DIVERSION**

(Feet)

**CODE 362**

**DEFINITION**

A channel constructed across the slope generally with a supporting ridge on the lower side.

**PURPOSE**

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

- Break up concentrations of water on long slopes, on undulating land surfaces, and on land that is generally considered too flat or irregular for terracing.
- Divert water away from farmsteads, agricultural waste systems, and other improvements.
- Collect or direct water for water-spreading or water-harvesting systems.
- Increase or decrease the drainage area above ponds.
- Protect terrace systems by diverting water from the top terrace where topography, land use, or land ownership prevents terracing the land above.
- Intercept surface and shallow subsurface flow.
- Reduce runoff damages from upland runoff.
- Reduce erosion and runoff on urban or developing areas and at construction or mining sites.
- Divert water away from active gullies or critically eroding areas.

- Supplement water management on conservation cropping or stripcropping systems.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all cropland and other land uses where surface runoff water control and or management is needed. It also applies where soils and topography are such that the diversion can be constructed and a suitable outlet is available or can be provided.

This practice is not applicable where construction would have a significant or detrimental effect to woody wildlife cover or wetlands.

Diversions shall not be substituted for terraces on land requiring terracing for erosion control.

Diversions shall not be used below high sediment-producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with or before the diversions.

**CRITERIA**

**Capacity.** Diversions protecting agricultural land must have the capacity to carry the peak runoff from a 10-year frequency, 24-hour duration storm as a minimum, with a freeboard not less than 0.3 ft.

Diversions protecting areas such as urban areas, buildings, roads, and animal waste management systems shall have a minimum capacity for the peak discharge from a storm frequency consistent with the hazard involved but not less than a 25-year frequency, 24-hour duration storm. Freeboard shall be not less than 0.3 ft.

The design capacity of the diversion shall be based on SCS-TP-61, "Handbook of Channel Design for Soil and Water Conservation" or other similar design procedures such as Agricultural Research Service (ARS) Agricultural Handbook 667, Stability Design of Grass-Lined Open Channels (Sept. 1987). Capacities for diversion channels are shown in NEH Part 650, Engineering Field Handbook, Chapter 9.

The diversion shall be divided into design reaches to meet changes in cross section, grade, or drainage area.

**Cross Section.** The channel may be parabolic, V-shaped, or trapezoidal. The diversion shall be designed to have stable side slopes. The ridge height shall include a settlement amount of 0.1 times ridge height or 0.5 feet, whichever is greater. The ridge shall have a minimum top width of 4 ft at the design elevation. The steepest constructed slope of a vegetated front or back ridge slope is 2(H):1(V). Farmable ridge and cut slope must be 5(H):1(V) or flatter. The minimum cross section shall meet the specified dimensions.

**Ridge height.** The top of the constructed ridge shall not be lower at any point than the design elevation plus the specified overfill for settlement and freeboard.

Where a diversion crosses a gully or swale and the settled fill height is 8 feet or more and total storage is 2 ac-ft or more, this section shall meet Pond (378) design criteria.

**Grade and velocity.** Channel grades may be uniform or variable. Channel velocity shall not exceed that considered nonerosive for the soil and planned treatment.

Design velocities shall meet the criteria shown in table 9-1, NEH Part 650, Engineering Field Handbook, Chapter 9.

**Location.** The location of the diversion shall be determined by outlet conditions, topography, land use, cultural operations, cultural resources, soil type, and length of slope.

A diversion in a cultivated field must be aligned to permit use of modern farming equipment.

**Protection against sedimentation.** If movement of sediment into the channel is a

significant problem, a vegetated filter strip shall be used except where soil and/or climate preclude the use of such strips. Then, the design shall include extra capacity for sediment and be supported by supplemental structures, cultural or tillage practices, or special maintenance measures.

**Outlets.** Each diversion must have an adequate outlet. The outlet may be a grassed waterway, a vegetated or paved area, a grade stabilization structure, a stable watercourse, or an underground outlet. The outlet must convey runoff to a point where outflow will not cause damage. Construction shall not be done on the right-of-way of a public road, highway, or other public utility until the landuser obtains written approval from the proper authorities. State water laws shall be adhered to in the diversion and disposal of drainage water.

Vegetative outlets shall be installed before diversion construction to insure establishment of vegetative cover in the outlet channel. The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface (tail water) in the outlet at their junction when both are operating at design flow.

The release rate of an under ground outlet, when combined with storage, shall be such that the design storm runoff will not overtop the diversion ridge. The underground outlet shall meet the requirements for underground outlets (620) or for subsurface drains (606). Conduits must be buried deep enough to prevent damage from tillage equipment. The inlet shall consist of a vertical perforated pipe as specified in underground outlet (620) specifications designed for its intended purpose. Table 2 in MO Supplement to NEH Part 650, Engineering Field Handbook, Chapter 8 may be used to select an adequate outlet.

**Vegetation.** Disturbed areas that are not to be farmed shall be established to grass as soon as practicable after construction. Top soiling may be necessary to facilitate revegetation. If the soils or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative means, such as mulches or gravel, may be used. Critical area planting (342) standards and specifications recommended in the technical guide will be

followed for seedbed preparation, fertilization and mulching.

**OPERATION AND MAINTENANCE**

Inspect ridge after each significant rainfall event and repair eroded areas. Also inspect the diversion outlet and promptly repair or replace damaged components as necessary.

The diversion shall be inspected periodically and the grass kept mowed, if vegetated. The ridge and channel shall be kept free of weeds, shrubs, trees, and burrowing animals.

Inspect flow area of channel and remove, if needed, sediment accumulation.

**PLANS AND SPECIFICATIONS**

Plans and specification for installing diversions shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

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**NATURAL RESOURCES CONSERVATION SERVICE  
MISSOURI CONSTRUCTION SPECIFICATION**

**FOR**

**DIVERSION  
(362)**

**General**

Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

**Site Preparation**

Foundation area shall be cleared of trees, stumps, roots, sod and other unsuitable material.

All dead furrows, ditches, or gullies shall be filled before constructing the diversion or shall be part of the construction. All old terraces and other obstructions shall be removed, as necessary, to install the diversion.

Construction methods that enhance wildlife will be used where practical. Trees, stumps, and brush removed from the construction area may be piled for wildlife habitat when approved by the landowner.

**Construction**

The diversion shall be constructed according to planned alignment, grade, and cross section with specified overfill for settlement and the channel graded to drain reasonably

well. The constructed cross section shall be as shown on drawings.

The moisture content of fill material shall be adequate for obtaining the required compaction. The minimum moisture content shall be such that when kneaded in the hand, the fill material will form a ball that does not readily separate. Fill material that is too dry shall have water added or work shall be stopped until moisture conditions are satisfactory.

Construction equipment travel shall be directed to provide compaction to earthfill in diversion ridge.

Any ditch or depression at the bottom of the backslope shall be filled and smoothed so that drainage will be away from the ridge and not parallel to it. Diversion ridges constructed across gullies or depressions shall be compacted by machinery travel or by other suitable means to insure proper functioning of the diversion.

If required on the drawings, topsoil shall be stockpiled and spread over excavations and other areas to facilitate revegetation.

If underground conduits are located under a diversion ridge, they shall be constructed according to Missouri Construction Specification for Underground Outlet (620) and the construction drawings.

**Vegetation**

Topsoil shall be added, if needed, to establish vegetation. Refer to JS-AGRON-7 for seeding and mulching recommendations.