

DITCH CHECK (MANUFACTURED) (no.)



(Source: Winnebago Soil and Water Conservation District)

DEFINITION

A pre-fabricated temporary dam or flow thru device installed across a swale or road ditch to reduce the velocity of water.

PURPOSE

The purposes of these practices are to reduce the velocity of concentrated storm water flows thereby reducing erosion of the swale or road ditch, trap sediment, promote settling of suspended solids behind the check, reduce scour and channel erosion, and promote infiltration when suitable soils are present.

CONDITIONS WHERE PRACTICE APPLIES

The use of manufactured ditch checks applies where grading activity occurs in areas of concentrated flows with slopes less than 8% and flow velocities less than 8 cfs and a temporary measure is needed to control erosion of the channel

until permanent stabilization practices can be implemented.

Manufactured ditch checks should be applied to ditches that cannot receive a permanent non-erodible lining, either synthetic or vegetated, due to ongoing construction activity.

Other applications include use of manufactured ditch checks to slow water velocity in a ditch while permanent vegetation is being established.

CRITERIA

The minimum height of manufactured ditch checks shall be 10 inches for synthetic porous runoff control structures and permeable ditch checks and shall not exceed a maximum height of 15 inches for other manufactured products.

Manufactured ditch checks such as rolled erosion control products must be trenched in 3 inches and staked through the outer mesh material at a 45 degree angle in the direction of flow. Staking this product as directed will prevent the ditch check from riding up the stakes during high flows. If rolled erosion control products are spliced, a minimum overlap equal to the diameter of the product shall be used.

Urethane foam geotextile ditch checks must be pinned from the middle out toward the edge of the fabric. The upstream ends of the urethane foam apron must be keyed into the soil to prevent under cutting of the check. The hinge of the urethane foam ditch check where the triangular foam is stitched to the apron must be placed on the upstream side of the ditch to prevent the foam from being dislodged and flipped over on its side.

Plastic permeable ditch checks and synthetic porous runoff control structure ditch checks must have either a biodegradable erosion control blanket or permanent erosion control blanket underneath them. The blanket must be toed into the soil and pinned to prevent undercutting of the check. Each of these ditch check types has a particular anchor pin system that must be followed to ensure stability of the panel from flows and proper connection of panel sections.

Vegetated ditch checks need to be anchored to the soil by inserting the hood into the trench and backfilling with soil. Check flaps need to be secured to adjoining segments to ensure water does not pass and cause erosion at joints.

Manufactured ditch checks are appropriate in shallow swales or ditches with slopes less than 8%. Most manufactured ditch checks are not appropriate for flow velocities higher than 8 fps.

A manufactured ditch check shall be selected to manage flows from a 10 year storm event or selected to match the ditch lining design year flow.

All manufactured ditch checks must be installed to ensure the center of the structure is at least 6 inches lower than outside edges of check to allow water to flow over the middle of the ditch check and not around the edges. Each manufactured ditch check shall have a central section/portion forming a horizontal weir and inclined portions which extend from the weir up the embankment and the backslope. Some manufacturers have criteria for number of panels or sections up slope based upon side slope ratios.

The control structures must be placed perpendicular to the direction of water flow. There must be firm contact between the bottom of the check and soil or base material, such as an erosion control blanket.

The anchoring systems specified for each type of manufactured ditch checks must be able to endure flow rates designed for the application including freeze thaw cycles.

Manufactured ditch checks must be spaced such that the top of the downstream check shall be at the same elevation as the bottom of the upstream check, or as specified in manufactures specifications.

Manufactured ditch checks, similar to other ditch check types, must be placed such that ponding water will not result in nuisance conditions to adjacent areas.

The manufacturer's specifications and recommendations shall be followed when selecting the appropriate manufactured ditch check.

CONSIDERATIONS

Various manufactured ditch check practices are used to prevent scour and slow the flow of water through a construction site. Using a series of manufactured ditch checks will increase their effectiveness. Manufactured ditch checks include urethane foam geotextiles, rolled erosion control products, plastic permeable checks, synthetic porous runoff control structures, vegetated ditch checks, and tube type products filled with various substances such as compost or shredded rubber (See IUM 805, Compost Filter Sock).

PLANS AND SPECIFICATIONS

Plans and specifications for installing manufactured ditch checks 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 include the following items at a minimum:

1. Locations and spacing of ditch checks.
2. Typical section details for the type of manufactured ditch check selected.

3. Installation details including anchoring systems.
4. Sequence and schedule of installation and removal.
5. Fabric specifications for material underneath plastic permeable and synthetic porous runoff control structure ditch checks.
6. All plans shall include a schedule for inspection and maintenance with the responsible person identified.

Standard drawings IUM- 514PC (Plastic Permeable Checks, IUM-514RC (Rolled Erosion Control Products), IUM-514SC (Synthetic Porous Runoff Control Structures), IUM-514UF (Urethane Foam Geotextiles), and IUM-514VC (Vegetated Ditch Check) may be used as the plan sheet.

OPERATION AND MAINTENANCE

Manufactured ditch checks shall be inspected every 7 days and after each 1/2 inch rainfall or snow equivalent.

Sediment shall be removed from the upstream side of the ditch check when sediment has reached one-half the height of the ditch check. Inspect any fabric for tears or dislodging after sediment is removed and repair or replace immediately. Additional requirements may apply per manufacturer specifications or permit requirements.

Products shall be maintained in same condition as when installed. Rolled erosion control ditch checks must be replaced whenever tears, splits,

unraveling or compressed straw or excelsior is apparent.

Any fabric used as a base or apron underneath the plastic permeable or synthetic porous runoff control structure ditch checks that is torn or dislodged must be replaced or repaired.

Remove debris (litter, corn stalks,) when observed.

Water or sediment going around the ditch check indicates incorrect installation or maintenance is required. The flow of water over the center of the ditch check or through the device must be reestablished. The manufactured ditch check may need lengthening up the side slope, sediment removed from pores, or the flow velocities are too great for the type of ditch check.

Manufactured ditch checks are not designed to be part of the permanent storm water management system. Their material components are not conducive to being incorporated into soils once they have reached their useful life.

Remove manufactured ditch checks once all upslope areas are stabilized and swale or ditch stabilization is complete. The biodegradable form of plastic permeable ditch checks can be left in place on top of the permanent stabilization such as blankets to provide velocity reductions provided they are not a hazard to mowing operations. Vegetated ditch checks may remain in place within the ditch or swale if permanent vegetation is desired such as in the case of establishing a vegetated swale.

REFERENCES

Illinois Department of Transportation, Bureau of Design and Environment Manual, Chapter 41 Construction Site Storm Water Pollution Control.

Illinois Department of Transportation, Erosion and Sediment Control Field Guide for Construction Inspection, July 2010.

Wisconsin Department of Natural Resources. Conservation Practice Standards, March 2006.

Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, January 1, 2007

Missouri Department of Transportation, Engineering Policy Guide. 806.8 Storm Water Pollution Prevention Plan (SWPPP).