



Standard Test Method for Determination of Temporary Ditch Check Performance in Protecting Earthen Channels from Stormwater-Induced Erosion¹

This standard is issued under the fixed designation D7208; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the guidelines, requirements, and procedures for evaluating the ability of temporary ditch check systems to protect earthen channels from stormwater-induced erosion. Critical elements of this protection are the ability of the temporary ditch check to:

1.1.1 Slow or pond runoff, or both, to encourage sedimentation, thereby reducing soil particle transport downstream;

1.1.2 Trap soil particles up stream of structure; and

1.1.3 Decrease soil erosion.

1.2 This test method utilizes full-scale testing procedures, rather than reduced-scale (bench-scale) simulation, and is patterned after conditions typically found on construction sites at the conclusion of earthwork operations, but prior to the start of revegetation work. Therefore this test method considers only unvegetated conditions.

1.3 This test method provides a comparative evaluation of a temporary ditch check to baseline bare soil conditions under controlled and documented conditions.

1.4 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice [D6026](#) unless superseded by this standard.

1.4.1 The procedures used to specify how data are collected/recorded and calculated in this standard are regarded as the industry standard. In addition, they are representative of the significant digits that should generally be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analysis methods for engineering design.

¹ This test method is under the jurisdiction of ASTM Committee [D18](#) on Soil and Rock and is the direct responsibility of Subcommittee [D18.25](#) on Erosion and Sediment Control Technology.

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1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units, which are provided for information only and are not considered standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Also, the user must comply with prevalent regulatory codes, such as OSHA (Occupational Health and Safety Administration) guidelines, while using the test method.*

2. Referenced Documents

2.1 ASTM Standards:²

[D653 Terminology Relating to Soil, Rock, and Contained Fluids](#)

[D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort \(12 400 ft-lbf/ft³ \(600 kN-m/m³\)\)](#)

[D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction](#)

[D6026 Practice for Using Significant Digits in Geotechnical Data](#)

[D6460 Test Method for Determination of Rolled Erosion Control Product \(RECP\) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion](#)

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, see Terminology [D653](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *temporary ditch check (in erosion control)*, *n*—a non-permanent barrier consisting of rocks, straw bales, excelsior logs, wattles, lumber, rock bags, interlocking pre-cast

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

concrete blocks, or other materials installed or constructed across a drainage way, swale, or other ephemeral waterway to reduce flow velocity, decrease erosion, and promote soil retention.

3.2.2 *trapezoidal test channel, n*—an earthen channel used to test erosion control products shaped such that the bottom is flat with sides greater than 90° angle in relation to the bottom of the channel.

4. Summary of Test Method

4.1 The performance of a temporary ditch check in reducing stormwater-induced erosion is determined by subjecting the material to simulated stormwater flow in a controlled and documented environment.

4.2 Key elements of the testing process include:

- 4.2.1 Calibration of the stormwater simulation equipment;
- 4.2.2 Preparation of the test channel;
- 4.2.3 Documentation of the temporary ditch check(s) to be tested;
- 4.2.4 Installation of the temporary ditch check(s);
- 4.2.5 Performance of the test;
- 4.2.6 Collection of hydraulic, topographical, and associated data;
- 4.2.7 Analysis of the resultant data; and
- 4.2.8 Reporting.

5. Significance and Use

5.1 This test method evaluates a system of temporary ditch checks and their means of installation to:

- 5.1.1 Reduce soil loss and sediment concentrations in stormwater runoff under conditions of varying channel conditions and soil type; and
- 5.1.2 Improve water quality exiting the area disturbed by earthwork activity by reducing suspended solids.

5.2 This test method models and examines conditions typically found on construction sites involving earthwork activities, including: highways and roads; airports; residential, commercial and industrial developments; pipelines, mines, and landfills; golf courses; etc.

5.3 This test method is a performance test. It is a comparative tool for evaluating the erosion control characteristics of different temporary ditch checks and can be used for quality control to determine product conformance to project specifications. Take caution when comparing results from different laboratories because information about between-laboratory precision is incomplete and slight differences in soil and other environmental and geotechnical conditions may affect temporary ditch check performance. Unique project-specific conditions should be taken into consideration.

NOTE 1—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

6. Apparatus

6.1 *Test Channel*—The earthen trapezoidal test channel shall be a minimum of 18 m (59 ft) in length. The channel shall be constructed to approximately a 5 % slope. The channel shall be constructed to a 0.6 m (2.0 ft) bottom width with 2H:1V side slopes prior to testing. The test channel shall have a way of measuring water discharging in to the channel. A weir is suitable this purpose.

6.2 *Water Delivery System*—The water delivery system shall include pump(s), piping, channels, and water control structures, as necessary, to achieve the desired hydraulic conditions. The water control structures shall regulate the flow and to direct it into the desired test channel. The water delivery system shall be constructed such that turbulence at the entrance to the test channel is minimized. Use of flow straighteners (for example, tube racks or vanes) will reduce turbulence and achieve uniform flow conditions. For this purpose, use a direct flow system (that is, controlled flow diverted from a natural waterway). The water delivery system in Fig. 1 shows an example of a closed-loop water delivery system.

6.3 *Total Station System*—The total station system is a standard surveying instrument that is capable of measuring vertical and horizontal angles, and distance, simultaneously to determine measurement point coordinates (that is, X, Y and Z axis) and that uses an internal data logger to store this information for future use. Instead of a total station system, manual surveying equipment may be used providing it supplies equivalent accuracy. Periodic calibration and certification of this equipment shall be performed.

6.4 *Velocity Probe*—A velocity probe capable of measuring point velocities to an accuracy of ± 0.03 m/s (± 0.10 ft/s) shall be used to identify flow conditions during test operation. Acceptable types of probes include electromagnetic, spinning cup, propeller, and static tube devices. Periodic calibration and certification of this equipment shall be performed.

6.5 *Miscellaneous*—Other miscellaneous equipment includes: meteorological equipment (wind speed, temperature, precipitation), and cameras or video recorders.

7. Reagents

7.1 *Water Source*—Any water source shall be suitable for testing provided that it is not sediment laden or contains deleterious materials that could impair the operation of the pumps.

8. Calibrations

8.1 Perform determination of the water delivery system discharge (Q). Begin calibration of the water delivery system when a steady-state flow is achieved.

8.2 For open-channel water delivery systems, measure the depth of water flowing into the test channel. Measure the velocity in the supply channel using a velocity probe in the measurement location shown in Fig. 2.

9. Procedure

9.1 *Trapezoidal Test Channel Preparation*

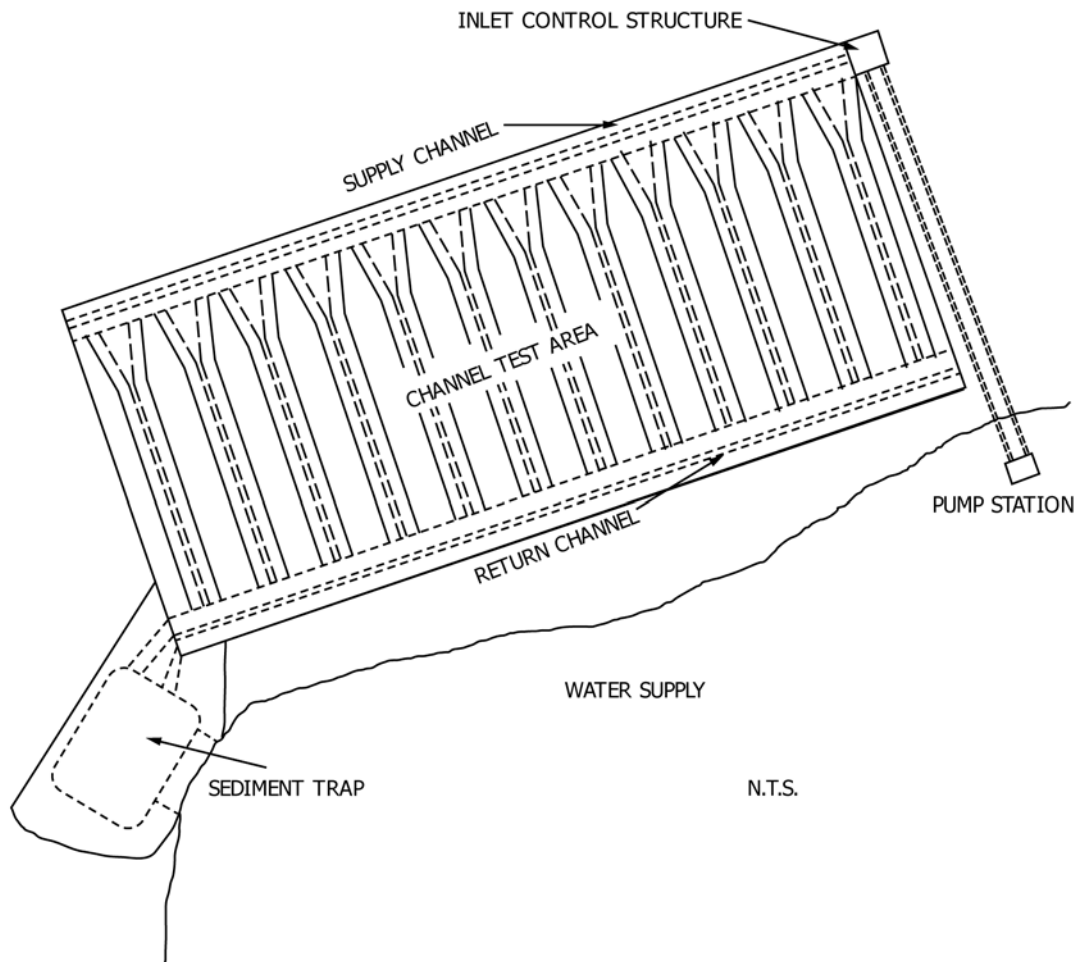


FIG. 1 Typical Water Delivery System

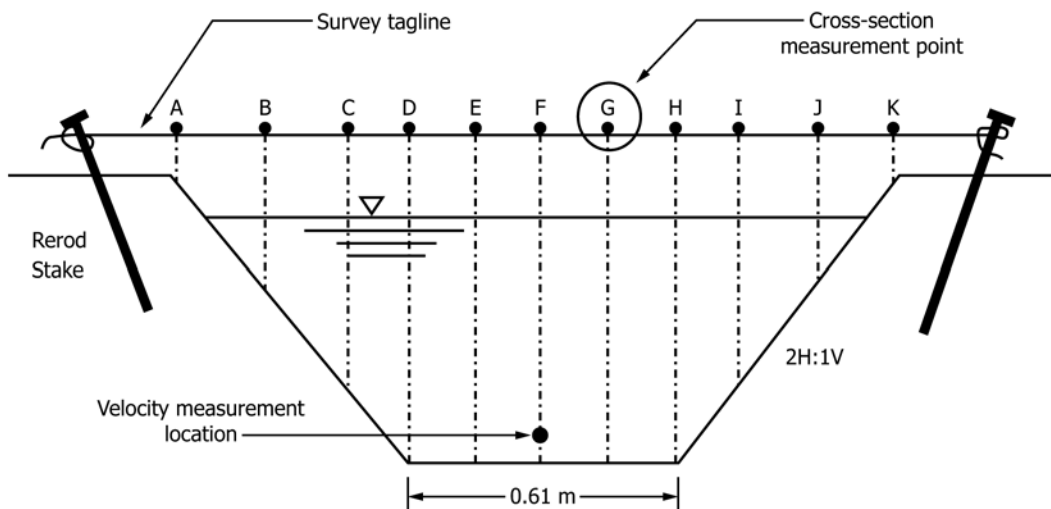


FIG. 2 Typical Channel Cross-Section

9.1.1 Construct earthen test channels using conventional earthwork placement techniques similar to procedures outlined in Test Method D6460 for trapezoidal channels. Perform compaction of channel bed material to create a stable subgrade.

9.1.2 Plate the channel surface with a minimum 45 cm (18 in.) thick veneer of soil. General soil types to be used for testing shall be loam, clay, and sand. Target grain sizes and plasticity indices are included in Table 1.