



Designation: D8202 – 18 (Reapproved 2024)

Standard Specification for Hydraulically Applied 100% Wheat Straw Fiber Mulches¹

This standard is issued under the fixed designation D8202; 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 specification covers the composition, physical requirements, manufacturing methods of hydraulically applied wheat straw fiber mulches for revegetation, sediment and erosion control.

1.2 The purpose of this specification is to provide a reference for describing and specifying wheat straw fiber mulch materials for hydraulic applications.

1.3 *Units*—The values stated in inch-pound units are to be regarded as standard, except as noted below. The values given in parentheses are mathematical conversions to SI units, which are provided for information only and are not considered standard. The sieve designations are identified using the “alternative” system in accordance with Practice E11, such as 3-in. and No. 200, instead of the “standard” of 75-mm and 75- μ m, respectively.

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values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this test method.

1.4.1 The procedures used to specify how data are collected/recorded and calculated in the standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should 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 be commensurate with these considerations. It is beyond the scope of these test methods to consider significant digits used in analysis methods for engineering data.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

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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1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- D2974 Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils
- D2976 Test Method for pH of Peat Materials
- 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 and Data Records in Geotechnical Data
- D7367/D7367M Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting
- D7560 Test Method for Determination of Fiber Length Percentages in Hydraulic Erosion Control Products (HECPs)
- E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Terminology

3.1 Definitions:

3.1.1 For definitions of common technical terms used in this standard, refer to Terminology D653.

3.1.2 *hydraulic erosion control product, (HECP)*, *n*—a manufactured, temporary, degradable, prepackaged fibrous material that is mixed with water and hydraulically applied as a slurry designed to reduce soil erosion and assist in the establishment and growth of vegetation.

3.2 Definitions of Terms Specific to This Standard:

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

3.2.1 *fiber mulch, n*—the mulching medium used either alone, or with additives, mixed with water in hydro-mulching equipment, wetting rapidly with uniform dispersal to create a homogeneous slurry.

3.2.2 *hydraulically applied, adj*—in erosion control, refers to the application method of a material using a water slurry, solution, or emulsion to the soil surface through various means, such as nozzle application by hose, tower, and aerially.

4. Materials and Manufacture

4.1 The use of the listed test methods and parameters are related to the manufacturing and end use of the material, to determine characteristics of products, and to make sure the product is fit for its intended use as a hydraulically applied wheat straw fiber mulch.

4.2 Wheat straw fiber mulches are manufactured from annually renewable wheat straw supplied from agricultural crop production and generated by harvesting the wheat grain. This type of straw produces a uniform wheat straw fiber.

4.3 Wheat straw fiber is not to be confused with hay or other grain crops. Wheat straw is an agricultural by-product, the dry stalks of cereal plants, after the grain and chaff have been removed for a consistent uniform fiber. Hay is defined as, or includes, mixtures of grasses, such as, ryegrass, brome, legumes, alfalfa and clovers with various harvest dates and qualities and often contains seeds.

4.4 Manufacturing Techniques:

4.4.1 *Hammer Milled*—The processing of wheat straw fibers by hammering them against a screen with specific opening diameter. It is intended to reduce the length of the particles to a size that facilitates mixing and hydraulic application without clogging the hydraulic machine's pump, piping hoses or nozzle tips.

4.4.2 *Atmospheric Refining*—The processing of the wheat straw fibers at atmospheric pressure by mechanically shearing and compressing the fiber between two refiner plates to produce a microscopically, rough and hairy appearance (Note 1). The hairy fibers increase fiber entanglement. This process also aids in killing viable seeds that may be in the wheat straw.

NOTE 1—Wheat straw fiber mulch can obtain a high quality product through the use of atmospheric refining.

5. Physical Properties

5.1 Table 1 presents requirements the wheat straw fiber mulch must meet.

TABLE 1 Wheat Straw Fiber Mulch Requirements

Property	Test Method	Requirement
Ash Content	D2974 (Method D)	≤3%
pH	D2976	4.0 - 8.5
Organic Matter	D2974 (Method D)	≥95%
Moisture Content	D2974 (Method A)	≤15%
Fiber Length	D7560	≤20% retained on the No.8 (0.0937 in.) sieve and ≤20% retained in the pan by mass
Water Holding Capacity	D7367/D7367M	≥800%

6. Sampling and Test Specimens

6.1 The sample to be used for evaluating the physical properties shall be obtained from a processed and packaged

bale of wheat straw fiber mulch that has no visible signs of tears or openings in the packaging. If the packaging of the bale is torn, do not use the bale for testing, as the moisture content will be affected.

6.2 Cut open the bale and select 40 g from each the top, middle, and bottom 1/3 of the bale for a total of 120 g. Place the fibers in a large mixing bowl and gently break the compressed fibers apart with your thumb and fingers. Mix thoroughly and make sure each of the test specimens are representative of the sample.

6.3 Select four test specimens to be tested following the specimen mass requirements given in the individual test methods listed in Section 7.

7. Test Methods

7.1 Use one of the test specimens to determine the moisture and ash contents and organic matter following Test Methods D2974. Record the moisture content to the nearest 1%, the ash content to the nearest 1%, and the organic matter to the nearest 1%.

7.2 Use one test specimen for each to determine the:

7.2.1 pH using Test Methods D2976. Record to the nearest 0.1 pH unit.

7.2.2 Fiber length using Test Method D7560. Record to the nearest 1%.

7.2.3 Water holding capacity using Test Method D7367/D7367M. Record to the nearest 10%.

NOTE 2—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 facility used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some, but not all, of those factors.

8. Rejection and Rehearing

8.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for rehearing.

8.2 In the event a sample fails to conform to the requirements of this specification, the manufacturer may test new bales of processed and packaged wheat straw fiber selected at random by the purchaser from the same lot. If the second set of tests also fails to conform to the requirements of this specification, the wheat straw fiber may be deemed unacceptable and the entire lot may be rejected by the purchaser.

9. Certification

9.1 When specified in the purchase order or contract, the purchaser shall be furnished certification stating samples representing each lot have been tested as indicated in this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished. Test reports may be transmitted to the purchaser by electronic services.