



Standard Specification for Geosynthetic Alternate Daily Covers¹

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1. Scope

1.1 This specification covers the requirements for reusable and nonreusable geosynthetic alternate daily covers (ADCs) used on the working face of municipal solid waste landfills (MSWLF). Geosynthetic ADCs include a wide range of products including, but not limited to, reinforced film, unreinforced film, reinforced sheet, unreinforced sheet, coated geotextile and uncoated geotextile.

1.2 This standard addresses the base ADC materials and does not address grommets, straps or other fabricated parts.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *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 requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 882 Test Methods for Tensile Properties of Thin Plastic Sheeting
- D 1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
- D 4355 Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
- D 4439 Terminology for Geosynthetics
- D 4533 Test Method for Trapezoid Tearing Strength of Geotextiles
- D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles
- D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
- D 6523 Guide for Evaluation and Selection of Alternative Daily Covers (ADCs) for Sanitary Landfills
- E 96 Test Methods for Water Vapor Transmission of Materials

2.2 Other Standards:

National Fire Protection Association (NFPA) 701 Standard Methods of Fire Tests for Flame Propagation of Textiles
Geosynthetic Research Institute (GRI) Specification GM11 Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device

3. Terminology

3.1 *Definitions*—For definitions of terms related to geosynthetics, refer to Terminology D 4439.

3.1.1 *alternate daily cover, n*—an alternative to the traditional 15 cm (6 in.) soil cover required by the USEPA for landfill working faces to “control disease vectors, fires, odors, blowing litter, and scavenging, without presenting a threat to human health and the environment.”

3.1.2 *fire retardant, adj*—in geosynthetic ADCs, meeting the requirements of NFPA 701, Method 1, Standard Method of Fire Tests for Flame Propagation of Textiles and Films.

3.1.3 *nonreusable, adj*—in geosynthetics, a fabric or film intended to be placed once and then disposed of, discarded, or left in place.

3.1.4 *reusable, adj*—in geosynthetics, a fabric or membrane material intended to be retrieved and installed more than once to perform the cover function.

3.1.5 *working face, n*—the area of a landfill in which waste is actively being deposited.

4. Classification of Geosynthetic ADCs

4.1 *Nonreusable*—Nonreusable geosynthetic ADCs consist of disposable films or geotextiles, intended to be left in place without retrieval. Special equipment exists to facilitate the placement and anchoring of these materials to cover the working face of landfills. The cover may contain pro-degradant additives to accelerate degradation within the waste to allow the free flow of fluids and gases within the waste mass. Three classes of nonreusable ADCs are specified based on tensile, tear and puncture properties (see Table 1).

4.2 *Reusable*—Reusable geosynthetic ADCs consist of various types of fabric or plastic membranes that have either been developed or adapted for use as a daily cover material. Panels fabricated from these materials are placed over the working face at the end of the day, and retrieved prior to the start of the next operating day. Special mechanized equipment can be used to facilitate the placement and retrieval of panels. Three classes

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TABLE 1 Classes for Nonreusable ADCs

Property	Test Method	Units	Class 1N	Class 2N	Class 3N
Breaking Factor	ASTM D 882	N/m (lb/in.)	93 (21)	62 (14)	31 (7)
Tear Resistance	ASTM D 1004	N (lb)	18 (4)	13 (3)	9 (2)
Puncture Strength	ASTM D 4833	N (lb)	62 (14)	44 (10)	27 (6)

of reusable ADCs are specified based on tensile, tear and puncture properties (see Table 2).

4.3 *Fire Retardant*—Meets the requirements of 6.4.

4.4 *UV Resistant*—Meets the requirements of 6.5.

5. Physical Properties

5.1 *General*—In order to gain the approval of regulatory agencies, ADCs must be demonstrated to be equivalent to soil daily cover with respect to controlling odor, blowing litter, disease vectors, scavengers and fire. Reusable ADCs must also have the strength and durability to withstand multiple uses, for a duration of one year. If nonreusable ADCs are left in place after use, they must degrade in a reasonable amount of time to allow the passage of liquid to the leachate collection system, or they must be physically perforated prior to burial.

6. Requirements and Test Methods

6.1 Odor control performance of a geosynthetic ADC depends on two factors, permeability of the ADC to gases and outside air movement under the ADC and back out from under the ADC at the edges of the product or through holes in the ADC.

6.1.1 Permeability of the ADC to water vapor must be no more than 6.0×10^{-6} g/s·m²·Pa (100 perms) when tested according to Test Methods E 96, method B.

6.1.2 Air flow and odor flow, out from under the ADC should be evaluated at a test site. Evaluation can be by assessment of odor by experienced personnel and/or by observation of insect and scavenger attraction to the site. Performance is compared to a traditional soil daily cover by observation.

6.2 Blowing litter and disease vector control is evaluated relative to traditional soil daily cover by observation at a test site.

TABLE 2 Classes for Reusable ADCs

Property	Test Method	Units	Class 1R	Class 2R	Class 3R
Grab Strength	ASTM D 4632	N (lb)	1400 (320)	900 (200)	500 (110)
Trapezoidal Tear	ASTM D 4533	N (lb)	500 (110)	320 (72)	180 (40)
Puncture Resistance	ASTM D 4833	N (lb)	500 (110)	320 (72)	180 (40)

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6.3 Scavenging is controlled by security procedures and other operating practices more than by the ADC. The ADC contributes to scavenger control by litter control, odor control and, to some extent, through durability, resisting penetration by scavengers. Scavenging control is evaluated by assessment of the other properties and by observation and comparison to soil cover.

6.4 Geosynthetic ADCs may be rated as “fire retardant.” To be rated as fire retardant, the ADC must pass NFPA 701, Method 1. The requirements are: flame out ≤ 2 s; average weight loss ≤ 40 %; no mass loss individual specimen deviating by more than three standard deviations from the mean.

6.5 UV resistance is required for reusable ADCs that are intended to be used for a long period of time and stored with exposure to sunlight. An ADC is designated as UV resistant when a loss of no more than 50 % of tensile strength occurs when the ADC is exposed to UV according to GRI Specification GM11 for a total of 1000 h or Test Method D 4355 for a total of 500 h. Tensile properties of the unexposed and exposed ADC are determined according to the appropriate tensile test method for that material (see Tables 1 and 2).

6.6 Nonreusable ADCs are divided into three classes based on tensile, tear and puncture strength (see Table 1). The appropriate test method for the materials are listed in the table. In order to be categorized under a specific class, an ADC must meet all three properties. For breaking factor and tear resistance the properties must be met in both machine and transverse directions. All values are minimum average roll values (MARV).

6.7 Reusable ADCs are divided into three classes based on tensile, tear and puncture strength (see Table 2). The appropriate test method for the materials are listed in the table. In order to meet the requirements of a class, an ADC must meet all three properties. For grab tensile and tear resistance the properties must be met in both machine and transverse directions. All values are minimum average roll values (MARV).

7. Sampling

7.1 *Laboratory Sample*—For laboratory testing, refer to the individual test standard for appropriate sample collection.

7.2 *Field Sample*—For field evaluation, material representative of the product shall be made available for site installation and evaluation. It is important that installation and anchoring procedures be representative of normal commercial use.

8. Keywords

8.1 alternate daily cover; landfill