Designation: D6523 – 22

Standard Guide for Evaluation and Selection of Alternative Daily Covers (ADCs) for Sanitary Landfills[1]

This standard is issued under the fixed designation D6523; 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 guide is intended to assist specifiers and end users in assessing the different options available for sanitary landfill daily cover materials described as alternative (non-soil) daily covers (ADCs). Traditional daily cover consists of at least 6 in. (15 cm) of soil spread over the working faces of sanitary landfills. Alternative systems are attractive to landfill operations in order to conserve landfill disposal space, among other reasons.

1.2 This guide assists in understanding different performance features of broad classifications of ADCs, and determining the extent and degree to which different ADCs are able to "control disease vectors, fires, odors, blowing litter, and scavenging, without presenting a threat to human health and the environment," as intended by United States Environmental Protection Agency (USEPA) regulations.

1.3 This guide is not intended to provide cost information regarding the various ADCs. As a standard guide, it does not dictate a protocol for the practice and testing of ADCs, but rather provides valuable information, guidance, and recommendations to interested parties concerning the many options available.

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

1.4.1 *Exception*—Metric units are used in 6.2.9.2.

1.5 *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]

D4982 Test Methods for Flammability Potential Screening Analysis of Waste

E96/E96M Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials

2.2 *Other Standards:*[3]

Solid Waste Disposal Facility Criteria, USEPA, Technical Manual EPA 530-R-93-017, Cover Material Requirements, 40 CFR 258 21, Nov 1993

"The Use of Alternative Materials for Daily Cover at Municipal Solid Waste Landfills" EPA 600/R-93/172 PB 92-227197, July 1993

Alternative Daily Cover Regulations, California Environmental Protection Agency, Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 4, Article 2, Section 20680 CIWMB Daily Cover and Section 20690 CIWMB Alternative Daily Cover

3. Terminology

3.1 *Definitions:*

3.1.1 *alternative daily cover, n*—an alternative to the traditional 6 in. (15 cm) 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 *foam, n*—a synthetic material sprayed and combined with air to form closed-cell air pockets.

3.1.3 *gas emissions, n*—a release of landfill gas generated within the waste mass into the atmosphere through cover materials.

3.1.4 *geosynthetic, n*—a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

[1] This guide is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.03 on Permeability and Filtration.

Current edition approved Dec. 1, 2022. Published December 2022. Originally approved in 2000. Last previous edition approved in 2014 as D6523 – 00 (2014)ε1. DOI: 10.1520/D6523-22.

[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.

[3] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

3.1.5 *indigenous, adj*—native to a particular region.

3.1.6 *leachate, n*—contaminated water resulting from the combination of waste with precipitation.

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

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

3.1.9 *sanitary landfill, n*—a regulated disposal site for the deposition of commercial and household wastes.

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

4. Significance and Use

4.1 This guide provides information which the regulator/permit officials, engineers, waste disposal operators, and others will find helpful to (*1*) understand and distinguish between the many choices available, (*2*) understand the performance feature considerations for living up to EPA regulations for landfill daily covers, and (*3*) understand the various requirements and differences for putting these covers into practice at landfills.

5. Classifications of ADCs

5.1 *Foams*—Foam ADCs are applied to the working face of sanitary landfills using foam generation and application equipment specifically designed for that particular foam. Both hardening and non-hardening foams are currently available. These foam layers are effectively broken up by the placement of additional wastes on the next operating day, and therefore do not interfere with fluid movement.

5.2 *Spray-On Slurries*—Most slurries are paper-based. The paper-based slurry ADCs are applied to the working face of sanitary landfills using standard hydro-seeding equipment. Certain types of slurries may require some modification of the hydro-seeding equipment. The slurries are allowed to harden to form a crust or shell over the working face. This covering is also broken up by the placement of additional wastes on the next operating day.

5.3 *Geosynthetics:*

5.3.1 *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. Some landfills use special mechanized equipment to facilitate the placement and retrieval of panels.

5.3.2 *Nonreusable*—Nonreusable geosynthetic ADCs consist of less durable disposable films or fabrics, intended to be left in place without retrieval. Special equipment also 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 cease the interception of fluids.

5.4 *Indigenous Materials*—Indigenous ADCs consist of various types of locally available waste products for disposal (for example, sludges, ash, shredded tires, shredded green waste, pulverized construction and demolition debris, automobile recycling fluff, foundry sand, and so forth) placed onto the working face of landfills in a manner similar to soil cover. They often require physical or chemical modification for consistency and workability, and evaluation for the presence of potentially hazardous constituents. Processed indigenous materials such as treated sludges and asphalt-stabilized soils are available from manufacturers who are able to provide such products with consistent properties. Manufacturers should have the necessary supporting data available for review. Unprocessed ADCs can vary significantly with respect to physical and chemical characteristics and composition, depending on the particular source. In addition, suitability and acceptability are dependent on site-specific climatic and operational conditions and regulatory requirements. Because of the wide variety of processed and unprocessed indigenous materials, only key factors and considerations related to the use and performance of these materials can hereby be presented.

6. Features and Considerations (see Table 1)

6.1 *Summary*—See discussion for clarification.

6.2 *Discussion:*

6.2.1 *Methods of Application:*

6.2.1.1 Manifold-equipped units apply foam as equipment traverses the working face. Self-propelled units with manifold applicator applies foam as the unit backs down the working face. Handheld hose-equipped units apply foam as the crew walks next to or across the working face, or both.

6.2.1.2 Most slurries use truck-mounted or trailer-mounted standard hydro-seeding equipment with little or no modification. It is applied through the spray tower located on the platform of the hydro-seeding equipment using appropriate nozzles. The use of a handheld hose may be suitable for certain applications. In at least one case, a specially designed storage unit and mobile applicator is required by the manufacturer. Care must be taken to avoid skimping on the thickness of application.

6.2.1.3 At some sites, ancillary equipment (for example, tow bar, lifting bar, reel, or rollers) are used to facilitate placement of geosynthetic panels (both reusable and nonreusable) and reduce wear and tear. Tires, sandbags, or ballast soil are placed along the edges to anchor the panels.

6.2.1.4 The preparation of the working face prior to placement of a geosynthetic panel and the care taken in placement of the panel can have a significant impact on the effective life of a panel. Consequently, operators should ensure that the working face is properly compacted to provide a smooth surface, and that protruding objects which could damage panels are eliminated. In addition, during placement of panels, measures should be taken to prevent unnecessary stress on the material and minimize snagging while dragging the panel across the working face.

6.2.1.5 Most indigenous materials may be spread and compacted in the same manner as traditional sands and gravels. Dozers and front-end loaders are usually used to spread the