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Standard Specification for Sprayed Slurries, Foams and Indigenous Materials Used As Alternative Daily Cover for Municipal Solid Waste Landfills¹

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1. Scope

1.1 This specification defines procedures for determining the performance of certain landfill daily cover materials generally described as an alternative daily cover (ADC). This specification applies only to slurries that are sprayed, foams that are spray applied, or indigenous materials that are placed onto the working face of a Municipal Solid Waste Landfill (MSWLF) unit as a cover. It is not applicable to other types of landfills. It does not apply to geosynthetics used as an ADC.

1.2 This standard addresses the evaluation of an ADC and its ability to control fires and odors and whether or not the cover contains materials that present a threat to human health and the environment. The control of disease vectors and blowing litter can be evaluated by observation, and scavenging is controlled by security procedures and other operating practices.

1.3 *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 4982 Test Methods for Flammability Potential Screening Analysis of Waste²

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

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D 6523 Guide for Evaluation and Selection of Alternative Daily Covers (ADCs) for Sanitary Landfills³

E 96 Test Methods for Water Vapor Transmission of Materials⁴

G 40 Terminology Relating to Wear and Erosion⁵

2.2 *Other Documents*.⁶

U.S. Environmental Protection Agency Regulations, Resource Conservation and Recovery Act, Subtitle D, Code of Federal Regulations, Protection of the Environment, Title 40, Part 258, Subpart CB Operating Criteria, Section 258.21 Cover Material Requirements, pp. 393-94, revised as of July 1, 1995

EPA Method 1311 Toxicity Characteristic Leaching Procedure

EPA Method 1312 Synthetic Precipitation Leaching Procedure

EPA Publication SW-846

EPA Method 8260

EPA Method 8270

3. Terminology

3.1 *Definitions*—For definitions of some terms used in this specification, refer to Terminology G 40.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *daily cover, n*—6 in. (152.4 mm) of earthen material that is spread and compacted on the top and side slopes of compacted solid waste, at least at the end of each operating day, which satisfies the U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Subtitle D.

3.2.1.1 *alternative daily cover material, n*—a substance or material other than 6 inches (152.4 mm) of earthen material, used for daily cover, which satisfies the U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Subtitle D, performance standards for an ADC (see Guide D 6523).

3.2.2 *foam, n*—a synthetic material sprayed and combined with air to form closed cell air pockets (see Guide D 6523).

3.2.3 *indigenous, adj*—native to a particular region (see Guide D 6523).

3.2.4 *leachate, n*—contaminated water resulting from the combination of waste with precipitation (see Guide D 6523).

3.2.5 *municipal solid waste landfill (MSWLF) unit, n*—a regulated disposal site for the deposition of commercial and household waste.

3.2.6 *working face, n*—the area of a landfill in which waste is actively being deposited (see Guide D 6523).

4. Significance and Use

4.1 The U.S. Environmental Protection Agency promulgated regulations under the Resource Conservation and Recovery Act, Subtitle D, which establish criteria for municipal solid waste landfills (MSWLF). These regulations became effective October 9, 1991. The cover material requirements of these regulations are set forth in 40 Code of Federal Regulations, Section 258.21 as follows:

(a) “Except as provided in paragraph (b) of this section, the owners or operators of all MSWLF units must cover disposed solid waste with six inches of earthen material at the end of each operating day, or at more frequent intervals if necessary, to control disease vectors, fires, odors, blowing litter, and scavenging.”

(b) “Alternative materials of an alternative thickness (other than at least six inches of earthen material) may be approved by the Director of the Solid Waste Regulatory Agency of an approved State if the owner or operator demonstrates that the alternative material and thickness control disease vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the environment.”

These federal regulations have the force of the law, and it is the purpose of this specification to define the test procedures necessary to comply with these regulations.

4.2 In order for a MSWLF landfill operator to obtain approval for use of an ADC, the operator must supply performance data to the state Solid Waste Regulatory Agency. In general, the technique used to obtain this permission involves applying to the state Solid Waste Regulatory agency for a sanitary MSWLF operating permit modification.

4.3 Parties interested in the evaluation technology described in the Standard Practice should include MSWLF operators, engineering firms, local, state, and federal Solid Waste Regulatory Agencies, and manufacturers and vendors of ADC materials.

5. Classification of ADCs (Other than Geosynthetic ADCs)

5.1 *Foams*—Foam ADCs are applied to the working face of MSWLF units using foam generation and application equipment specifically designed for that particular foam. Both hardening and non-hardening foams are currently available.

² *Annual Book of ASTM Standards*, Vol 11.04.

³ *Annual Book of ASTM Standards*, Vol 04.13.

⁴ *Annual Book of ASTM Standards*, Vol 04.06.

⁵ *Annual Book of ASTM Standards*, Vol 03.02.

⁶ Available from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

5.2 *Spray-On Slurries*—Most ADC slurries are paper-based. The paper-based slurry ADCs are applied to the working face of MSWLF units 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.

5.3 *Indigenous Materials*—Indigenous ADCs consist of various types of locally available waste products (for example, sludges, ash, contaminated soils, shredded tires, shredded green waste, pulverized construction and demolition debris, automobile recycling fluff, foundry sand, etc.). These indigenous ADCs are placed onto the working face of MSWLF units in a manner similar to soil cover. They often require physical or chemical modification for consistency and workability and are usually evaluated for the presence of potentially hazardous constituents. Unlike commercially available ADCs, each of these materials can vary significantly in respect of physical and chemical characteristics and composition, depending upon the source of the indigenous material. In addition, suitability and acceptability are dependent on site-specific climatic and operational conditions and regulatory requirements.

6. Physical Properties

6.1 *General*—The experimental procedures and results are selected to ensure that the ADC material controls disease vectors, fires, odors, blowing litter, and scavenging, and that the ADC itself does not present a threat to human health and the environment.

6.2 Control of Fires:

6.2.1 Test Method A of Test Methods D 4982, shall be used to indicate the fire-producing potential of those ADCs covered by this standard that are sprayed as a slurry, applied as a foam or indigenous materials that are placed on disposed solid waste in a landfill. Prepare the specimens according to the manufacturers instructions and condition at 120 °F (48.9 °C) to constant mass before tests. Constant mass is determined by successive weighing at two-hour intervals that do not change more than 1%. Test within 15 min or place the conditioned specimen in a dessicator until test is performed.The test result shall be pass or fail.

6.3 Control of Odors:

6.3.1 The Water Method of Test Methods E 96, can be used to determine the water vapor permeance of a representative sample of the ADC to be tested. The standard test condition shall be that set forth in Appendix X1.1.2 Procedure B, Water Method at 73.4°F (23°C).

NOTE 1—One sprayed-slurry ADC has a measured permeance of 1.81×10^{-4} g/h-cm²-mmHg (Water Method of Test Methods E 96) The permeance of Ottawa Sand is 2.87×10^{-4} g/h-cm²-mmHg when measured in the same manner. The lower the water vapor transmission rate, the greater potential odor control a particular ADC may provide. Test Methods E 96 test results may be used to compare one ADC to another.

6.3.2 The Water Method of Test Methods E 96 may not be appropriate for some materials. Odor control can be determined by visual observation of the reduction of fly and bird population and by the reduction in scavenging in areas where ADC has been applied.

6.4 Analysis of Daily Cover Materials to Ensure They Do Not Present a Threat to Human Health and the Environment :

6.4.1 A representative sample (samples) of the ADC, as it is expected to be used at a landfill, shall be collected and analyzed as follows:

6.4.1.1 The sample shall be prepared using the Toxicity Characteristic Leaching Procedure (TCLP), EPA Method 1311. The resulting extract must be analyzed for the parameters contained in 40 CFR 261.24 and with the resulting concentrations compared to their corresponding EPA regulatory levels. Should any of the parameter concentrations in the TCLP test exceed EPAs regulatory levels, then The ADC shall not be allowed for use in landfills.

6.4.1.2 The sample must be subjected to total analysis for: (a) the eight RCRA metals, and aluminum, antimony, beryllium, nickel, sodium, and thallium using the appropriate test methods for these metals contained in EPA Publication SW-846, latest edition; (b) volatile organic compounds using EPA Method 8260; and (c) semi-volatile organic compounds using EPA Method 8270.

6.4.2 *Leaching Potential*—A representative sample (samples) of the ADC, as it is expected to be used at a landfill, shall be collected and analyzed as follows:

6.4.2.1 To evaluate the leaching potential of the ADC, the sample shall be prepared using the Synthetic Precipitation Leaching Procedure (SPLP), EPA Method 1312. The extract prepared with this procedure shall then be analyzed for: (a) the eight RCRA metals, and aluminum, antimony, beryllium, nickel, sodium, and thallium using the appropriate test methods for these metals contained in EPA Publication SW-846, latest edition; (b) volatile organic compounds using EPA Method 8260; and (c) semi-volatile organic compounds using EPA Method 8270.

6.5 Control of Disease Vectors, Blowing Litter, and Scavenging:

6.5.1 The control of disease vectors and blowing litter can be evaluated by observation.

6.5.2 Scavenging is controlled by security procedures and other operating practices.

7. Qualified Laboratories

7.1 All tests required by this standard shall be conducted at accredited laboratories.

8. Keywords

8.1 alternative daily cover; foams; landfill; slurries

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