Designation: D 7007 – 03

Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth Materials[1]

This standard is issued under the fixed designation D 7007; 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 standard practice describes standard procedures for using electrical methods to locate leaks in geomembranes covered with water or earth materials containing moisture.

1.2 This standard practice is intended to ensure that leak location surveys are performed with demonstrated leak detection capability. To allow further innovations, and because various leak location practitioners use a wide variety of procedures and equipment to perform these surveys, performance-based operations are used that specify the minimum leak detection performance for the equipment and procedures.

1.3 This standard practice requires that the leak location equipment, procedures, and survey parameters used are demonstrated to result in an established minimum leak detection sensitivity. The survey shall then be conducted using the demonstrated equipment, procedures, and survey parameters.

1.4 Separate procedures are given for leak location surveys for geomembranes covered with water and for geomembranes covered with earth materials. Separate procedures are given for leak detection sensitivity tests using actual and artificial leaks.

1.5 Leak location surveys can be used on geomembranes installed in basins, ponds, tanks, ore and waste pads, landfill cells, landfill caps, and other containment facilities. The procedures are applicable for geomembranes made of materials such as polyethylene, polypropylene, polyvinyl chloride, chlorosulfonated polyethylene, bituminous material, and other electrically-insulating materials.

1.6 **Warning**—The electrical methods used for geomembrane leak location could use high voltages, resulting in the potential for electrical shock or electrocution. This hazard might be increased because operations might be conducted in or near water. In particular, a high voltage could exist between the water or earth material and earth ground, or any grounded conductor. These procedures are potentially VERY DANGEROUS, and can result in personal injury or death. The electrical methods used for geomembrane leak location should be attempted only by qualified and experienced personnel. Appropriate safety measures must be taken to protect the leak location operators as well as other people at the site.

1.7 *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.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 4439 Terminology for Geosynthetics

D 6747 Guide for Selection of Techniques for Electrical Detection of Potential Leak Paths in Geomembranes

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *artificial leak*, *n*—an electrical simulation of a leak in a geomembrane.

3.1.2 *current source electrode*, *n*—the electrode that is placed in the water or earth material above the geomembrane.

3.1.3 *dipole measurement*, *n*—an electrical measurement made on or in a partially conductive material using two closely-spaced electrodes.

3.1.4 *earth material*, *n*—sand, gravel, clay, silt, combinations of these materials, and similar materials with at least minimal moisture for electrical current conduction.

3.1.5 *leak*, *n*—any unintended opening, perforation, slit, tear, puncture, crack, hole, cut, or similar breaches through an installed geomembrane. Significant amounts of liquids or solids might or might not flow through a leak. Scratches, gouges, dents, or other aberrations that do not completely penetrate the geomembrane are not considered to be leaks.

3.1.6 *leak detection sensitivity*, *n*—the smallest size leak that the leak location equipment and survey methodology are capable of detecting under a given set of conditions. The leak detection sensitivity specification is usually stated as a diameter of the smallest leak that can be reliably detected.

[1] These practices are under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

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[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.

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