



Standard Practice for Leak Location on Exposed Geomembranes Using the Water Puddle System¹

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1. Scope

1.1 This standard is a performance-based practice for electrical methods for detecting leaks in exposed geomembranes. For clarity, this document uses the term “leak” to mean holes, punctures, tears, knife cuts, seam defects, cracks and similar breaches in an installed geomembrane (as defined in 3.1.5).

1.2 This standard can be used for geomembranes installed in basins, ponds, tanks, ore and waste pads, landfill cells, landfill caps, canals and other containment facilities. It is applicable for geomembranes made of materials such as polyethylene, polypropylene, polyvinyl chloride, chlorosulfonated polyethylene, bituminous geomembrane, and any other electrically-insulating materials.

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 limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

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:

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

3.1.2 *electrodes, n*—the conductive plate that is placed in earth ground or in the material under the geomembrane or a conductive structure, such as a copper manifold, that is placed in the water puddle on the geomembrane.

3.1.3 *electrical leak location, n*—a method which uses electrical current or electrical potential to detect and locate leaks.

3.1.4 *geomembrane, n*—an essentially impermeable membrane used with foundation, soil, rock, earth or any other geotechnical engineering related material as an integral part of a man made project, structure, or system.

3.1.5 *leak, n*—for the purposes of this document, a leak is any unintended opening, perforation, breach, slit, tear, puncture, crack, or seam breach. Significant amounts of liquids or solids may or may not flow through a leak. Scratches, gouges, dents, or other aberrations that do not completely penetrate the geomembrane are not considered to be leaks. Leaks detected during surveys have been grouped into five categories:

3.1.5.1 *holes*—round shaped voids with downward or upward protruding rims.

3.1.5.2 *tears*—linear or areal voids with irregular edge borders.

3.1.5.3 *linear cuts*—linear voids with neat close edges.

3.1.5.4 *seam defects*—area of partial or total separation between sheets.

3.1.5.5 *burned through zones*—voids created by melting polymer during welding.

3.1.6 *leak detection sensitivity, n*—the smallest 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.

3.1.7 *current, n*—the flow of electricity or the flow of electric charge.

3.1.8 *water puddle, n*—for the purposes of this document, a water puddle is a small pool of water being contained and pushed by a squeegee installed on the leak location system.

3.1.9 *squeegee, n*—for the purposes of this document, a squeegee is a device used to contain and push water on top of an exposed geomembrane. It may consist of a handle and a transverse piece at one end set with a strip of leather or rubber.

3.1.10 *metalized geotextile, n*—a geotextile incorporating metallic strips that can conduct electrical current.

4. Summary of Practice

4.1 *The Principle of the Electrical Leak Location Method Using the Water Puddle System:*

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