



Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes¹

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1. Scope

1.1 This guide describes standard procedures for using electrical conductance measurement methods to locate leaks in exposed or covered waterproof membranes.

1.2 This guide addresses the need for a general technical description of the current methods and procedures that are used to test and verify the integrity of waterproof membranes.

1.3 This guide is not intended to replace visual, infrared, or other methods of inspection. It is to be used in conjunction with other methods of roof inspection when specified.

1.4 This guide recommends that the leak location equipment, procedures, and survey parameters used are calibrated to meet established minimum leak detection sensitivity. The leak detection sensitivity calibration should be verified on a regular basis according to the manufacturer's recommendations.

1.5 Leak location surveys can be used on waterproofing membranes installed in roofs, plaza decks, pools, water features, covered reservoirs and other waterproofing applications.

1.6 The procedures are applicable for membranes made of materials such as polyethylene, polypropylene, polyvinyl chloride, bituminous material, and other electrically insulating materials.

1.7 This guide provides a general description of the equipment and methods for locating membrane breaches using electric conductance. Refer to the manufacturer's instructions for the proper operation and use of the equipment described in this guide.

1.8 *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

D1079 Terminology Relating to Roofing and Waterproofing
D5957 Guide for Flood Testing Horizontal Waterproofing Installations

D6747 Guide for Selection of Techniques for Electrical Detection of Leaks in Geomembranes

2.2 *NFPA Standard*:³

NFPA 70 National Electric Code

3. Terminology

3.1 For definitions of terms, see Terminology D1079.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *breach*—as defined for this guide, a membrane breach is a defect in the membrane that allows surface water to reach the substrate below.

3.2.2 *conductance*—the ability of a material to pass electrons. The unit of conductance is the Siemens (S), the relationship that exists between resistance (R) and conductance (G) is a reciprocal one. In terms of resistance and conductance:

$$R = 1/G \text{ ohms, } G = 1/R \text{ Siemens} \quad (1)$$

3.2.3 *deck*—the structural surface to which the roofing or waterproofing system (including insulation) is applied.

3.2.4 *electric current*—the flow of electric charge. The electric charge that flows is carried by mobile electrons in a conductor measured in amps.

3.2.5 *electric gradient*—the potential difference between two points measured in volts.

3.2.6 *high voltage*—for purposes of this guide, the United States 2005 National Electrical Code (NEC) defines high voltage as any voltage over 600 V (article 490.2).

3.2.7 *leak*—any unintended opening, perforation, slit, tear, puncture, crack, hole, cut, or similar breaches through an

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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.

³ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.