2023 Edition

Honza Group Incorporated

Understanding Electronic Leak Detection

Honza Group Inc.

The problem of water penetration through roofing and waterproofing assemblies is common to many buildings. Low slope roofs, commonly referred to as "Flat Roofs," have a disproportionate share of leaks. This is due mostly to the fact that the installed membrane is not only expected to prevent water penetration, but also act as a staging area and work platform for other trades during construction. In cases where the design of the roof calls for the membrane to be left exposed after construction has been completed, new breaches to the roof assembly can occur during building maintenance of roof top equipment and adjacent surfaces.

Honza Group Incorporated offers over 50 years of experience in every facet of the roofing and waterproofing industry. Our firm has acquired an in-depth knowledge of a broad range of roofing and waterproofing products and installations that have been used in conjunction with ELD. Honza Group has surveyed 20 million+ square feet of roofs, as well as participated in the design and installation of waterproofing assemblies for over 8,000 projects.

Honza Group Incorporated | Electronic Leak Detection | www.HonzaGroupInc.com
9841 Brokenland Parkway, Suite 307 Columbia, MD 21046
(V) 301.953.7210 (F) 301.953.2104

Flood Testing (Trial and Error) **vs. Electronic Leak Detection**

The old-school flood testing technique was the standard for decades. The intent was that if enough water pressure was created, any anomalies in the membrane would result in an interior leak. This "Trial and Error" procedure would deduce the approximate location of the leak based on where the water showed up inside the building. A technician would then investigate on their hands and knees, attempting to locate all the possible deficiencies that might have caused the leak. This type of leak detection was not always successful and often had to be repeated numerous times before the leak was found.

With innovative state-of-the-art leak detection equipment, electricity can now be utilized to follow the path of a leak and will locate its exact pin-point location without the application of hundreds or thousands of gallons of water as used in traditional flood testing.

Electronic Leak Detection (ELD) locates breaches through a roofing or waterproofing membrane by measuring, or more accurately put, following electric current across the surface of the membrane, through a breach, to the structural deck or conductive substrate. ELD can be used as a quality assurance test method at the completion of the membrane application on new construction and membrane replacement projects, as well as a means of locating the exact source of existing leaks well after construction has been completed.

In the last 10 years,

Honza Group has performed

Electronic Leak Detection on

50+ Million
square feet of surface space.

That's enough to fill

7,700
football fields.

ELD can be completed on non-conductive membranes such as built-up roof membranes, modified bitumen membranes, hot fluid applied rubberized asphalt, self-adhering polymer modified roll goods, urethane membranes, thermal welded (thermoplastic) membranes and white EPDM (thermoset) membranes. ELD is not effective on black EPDM due to it's conductive composition.

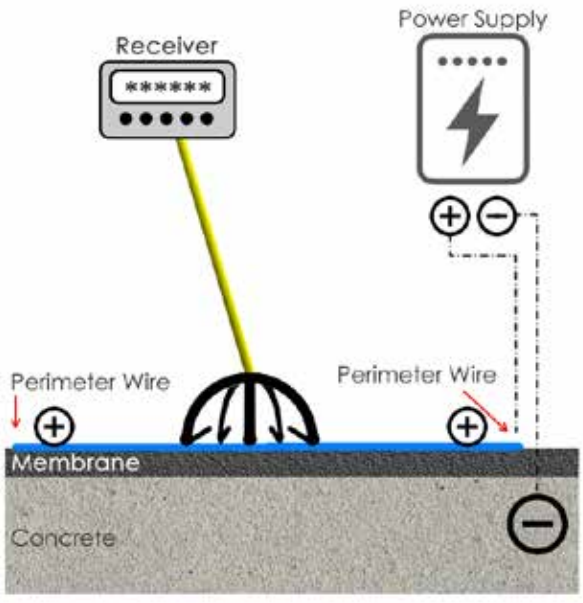
Low Voltage

Quick Facts Low Voltage

- Less time consuming than Flood Testing.
- Testing not impacted by steeper slopes.
- Saves water (wetted not flooded)
- Breaches located with pinpoint accuracy.
- Wiring can be left in place for future testing through overburden in many cases.

A wire loop, to act as a conductor, is placed directly on the membrane or the membrane's protection course, around the perimeter of the area to be tested. Additional wire loops, that tie into the perimeter wire, are used to isolate any conductive penetrations (e.g., drains, pipe penetrations, etc.) in order to prevent the testing grid from grounding out. One of the two leads from an electric pulse generator is connected to the wire loop conductor. A second lead from the pulse generator is grounded to the structural deck. The surface of the waterproofing must be wetted (not flooded) to provide an electrically conductive medium.

Every few seconds a low-voltage charge is delivered from the pulse generator for a one-second duration. As a result, an electrical potential difference is created between the membrane surface, which is wet, and the structural deck, which is "earthed" or grounded – essentially producing two opposing electric plates. If there are any breaches through the waterproofing membrane, which acts as an electric insulator, the small electric current will flow across the membrane surface and down through the breach, completing the circuit between the two "electric plates."



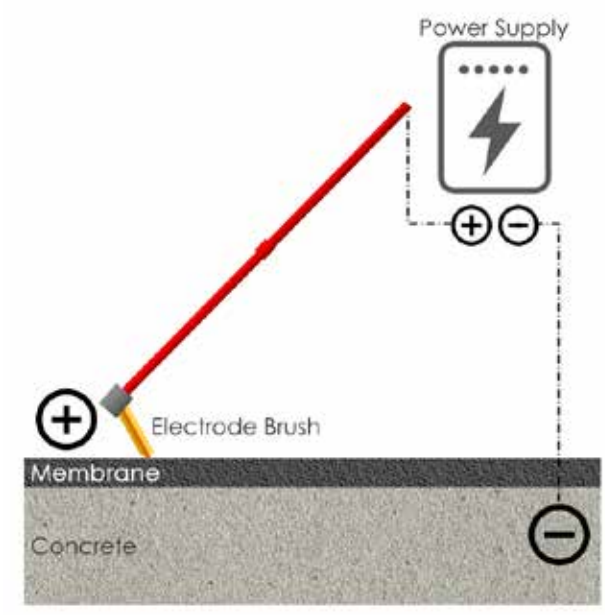
A technician uses a sixteen-probe receiver to identify the directional flow of the electric current. By moving the receiver across the membrane, the technician can systematically follow the flow to even the smallest breach. Once located, the breach in the membrane can be repaired by the waterproofing contractor, and quickly retested by the technician, ensuring the watertightness of the waterproofing system.

High Voltage

Quick Facts High Voltage

- Less time consuming than Flood Testing.
- Testing not impacted by steeper slopes.
- No water used (membrane must be dry)
- Breaches located with pinpoint accuracy.
- Wiring can be left in place for future Low Voltage testing through overburden in many cases.
- Vertical walls readily tested.

Like Low Voltage, the power supply for the testing equipment is still grounded to the conductive deck and the membrane acts as the electric insulator between the two electric plates. A continuous, higher voltage charge than that produced by the Low Voltage pulse generator, is delivered from the self-contained generator within the High Voltage testing equipment, to the conductive deck. This creates one electric plate. The second electric plate is created by the broom head electrode of the testing equipment. When the broom head electrode, which is made of small conductive bristles, makes contact with a breach in the membrane, the electric current is allowed to flow, completing the circuit between the two electric plates. When this happens, the equipment emits an audible tone to alert the technician that there is a breach within the area of the broom head. The area is then swept again, but this time the contact area of the broom head is reduced, enabling the technician to pinpoint the exact location of the breach.



There is a misconception that High Voltage testing is dangerous because it uses higher voltage than Low Voltage testing. While the voltage is higher than that used by the Low Voltage testing equipment, the amperage used for High Voltage testing equipment is still low, presenting no serious risk of injury to personnel or damage to the building's components or equipment.

Unlike Low Voltage, High Voltage testing does not require that water be applied to the membrane. In fact, testing must be done when the membrane is dry.

Project Logistics

A standard engagement with Honza Group consists of a detailed findings report, that includes general project information, noted site conditions (with photographs), breach photographs and their measured locations. Digital drawings are also a standard deliverable, which highlights the area(s) tested, with all breach locations plotted.

Reporting / Sample Breach Location

Fasteners & numerous debris cause a great deal of damage to roofing & waterproofing membranes during construction. An ELD scan would identify the damages below as well as similar breaches.

Puncture A

Location (Feet) - 161' / 10.5'

Puncture B

Location (Feet) - 5' / 12.5'

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