

SECTION 07 59 00

ELECTRONIC LEAK DETECTION - LOW VOLTAGE VECTOR MAPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Engage an Independent Testing Agency to provide a Certified ELD Technician to perform Electronic Leak Detection to verify that membrane is free of any holes, open seams or capillary defects that will allow water to pass. Electronic Leak Detection shall include:
 - 1. Low Voltage Vector Mapping Survey for roofing and waterproofing membranes.
 - 2. When required, a permanent Electronic Leak Detection System (ELDS) for roofing and waterproofing membranes.

1.2 SUBMITTALS

- A. Field Quality-Control Reports: Prepare and submit hard copy and digital reports with a description of the ELD techniques employed, summary of findings, and CAD scaled drawings of the tested areas with the locations of all defects (and trace wire and connection boxes if provided) accurately mapped on the drawing.

1.3 QUALITY ASSURANCE

- A. Installing and Testing Firm Qualifications: The approved Independent Testing Agency shall have a minimum three year record of satisfactory experience providing Low Voltage Vector Mapping services on projects of similar size and scope.

1.4 BREACH-FREE CERTIFICATION

- A. Breach-Free Certification of Membrane Integrity: At the conclusion of the testing, the testing agency shall provide a Breach-Free Certification of Membrane Integrity, provided the following conditions are met:
 - 1. Contractor provides personnel and materials to repair any defects located with the testing.
 - 2. Repair materials have sufficient time to set up to allow the ELD Technician to utilize Low Voltage Vector Mapping to retest any problem areas.
 - 3. All repairs pass retesting.

PART 2 - PRODUCTS

2.1 ELECTRONIC LEAK DETECTION

- A. Independent Testing Agency, Basis of Design: **IR Analyzers / Vector Mapping** (1-800-879-1964) Low Voltage Vector Mapping - Nondestructive Testing.

2.2 LOW VOLTAGE VECTOR MAPPING

- A. Scope: Perform a Low Voltage Vector Mapping Survey on all horizontal membrane areas in the contract. Low Voltage Vector Mapping shall be performed on a wetted membrane surface.

2.3 PERMANENT ELECTRONIC LEAK DETECTION SYTEM (ELDS)

- A. Scope: At areas where the membrane will be covered with overburden, the ELD Technician will install a permanent on demand Electronic Leak Detection System to facilitate future Low Voltage Vector Mapping with the overburden in place. The ELDS will consist of trace wire loops installed on top of the membrane in area increments not to exceed 7500 sf, and low voltage connection boxes to provide access to the trace wire loops. Trace wire loops to be installed by ELD Technician. Connection boxes to be installed by Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. The ELD Technician will meet with the Installer and review the sizes and locations of areas to be tested.

3.2 TESTING PROCEDURES - LOW VOLTAGE VECTOR MAPPING

- A. Test equipment shall consist of a portable battery powered generator capable of providing a pulsed 38-40 volt DC current, two sensor poles, current flow detector (potentiometer) and trace wire. The trace wire will consist of .38mm polyethylene monofilament tightly twisted with 9 strands of .20mm stainless steel wire and have a minimum tensile strength of 180 pounds.
- B. Place and secure conductive trace wire around the perimeter of the area being tested in area increments not to exceed 7500 sf. Place trace wire on top of membrane approximately 4 inches from the perimeter. Each successive test will overlap the areas previously tested by a minimum of 3 inches.
- C. As needed, provide metal penetrations through the membrane with isolation loops connected to the perimeter trace wire to prevent unintended grounding (false positives).
- D. Connect one terminal of the pulse generator to the trace wire loop. Connect the other terminal to a ground within the assembly (typically a steel or concrete deck or alternative grounding medium such as a conductive primer or metal grid).
- E. Wet the entire test area prior to the start of each test and introduce current to create an electrical "plate" on the surface of the membrane. Maintain wet for the duration of the testing.
- F. Utilize the potentiometer and two poles to methodically test all horizontal membrane surfaces in the contract. If no current flow is detected, the ELD Technician will certify that the tested area is free of any holes, open seams or capillary defects that will allow water to pass.
- G. Current flow indicates that current has grounded through a breach. The ELD Technician will trace the current vectors to their source(s) and locate any membrane breaches. Breaches will be marked on the membrane surface with spray paint, chalk, tape or other approved method and will either be repaired, or screened from the test area with isolation loops. Testing will continue until all breaches in each test area are located, repaired and retested, or isolated with trace wire loops, and there are no longer current vectors to interpret.

- H. The ELD Technician shall maintain communication with the Contractor's representative regarding the number and locations of breaches detected.

3.3 PERMANENT ELECTRONIC LEAK DETECTION SYTEM (ELDS)

- A. When required, install a permanent on demand Electronic Leak Detection System of top of the membrane. The ELDS will consist of trace wire loops installed on top of the membrane in area increments not to exceed 7500 sf, and low voltage connection boxes to provide access to the trace wire loops. Trace wire loops to be installed by ELD Technician. Connection boxes to be installed by Contractor.

3.4 FIELD QUALITY CONTROL

- A. Contractor shall repair or remove and replace components of membrane system where test results indicate holes, open seams or capillary defects that will allow water to pass.
- B. After repairs are complete as per roofing or waterproofing membrane manufacturer's requirements, retesting in repaired areas will be performed at Contractor's expense to verify the integrity of the membrane.

END OF SECTION