

Quality Assurance for Roofing and Waterproofing

Electric Field Vector Mapping (EFVM) is a powerful tool for improving quality control on waterproofing systems. Although this method is relatively new to most of North America, it has already achieved a long record of success in Europe. Unlike most other leak detection methods, it can locate the point of entry quickly and accurately. The technique is simple; a wire is laid around the perimeter of the roof and the roof deck is grounded. The roof surface is misted and the roof energized. A voltage meter is used with wands in a “divining rod” fashion to locate any leaks. Another unique aspect of this technique is that a pinhole (too small to find visually) is a easy to locate as a large tear or failed seam.

Alternative approaches, like infrared surveys, can determine where water has accumulated in the roof insulation, but may not be as useful in actually finding the waterproofing defect. The traditional flood test also has its practical problems. Even if the structure can take the extra load, if the membrane is not watertight the roofing substrate could become saturated and permanently damaged as well as any materials below. And often “dams” have to be built to compartmentalize the water used to flood the roof. And after the water is drained off, the punctures still have to be located. For especially sensitive applications, where water integrity is of the utmost importance, both techniques are often used.

EFVM is particularly useful for plazas or “green roofs” where there is “overburden” which would prohibit or make it difficult to find or repair a leak. EFVM can be used to locate leaks very precisely so they can be repaired with minimal disruption of the green roof assembly. In addition to precisely locating even very tiny leaks, a key advantage is that the wire can be left in place after construction is complete so that if any leaks occur in the future, they can be quickly located, even if there is an overburden.

It is important that the roofing/waterproofing membrane be brought up to within a few inches of the grade at the perimeter (I would always do that but apparently some architects don’t and that is a problem with EFVM). Also note that EFVM cannot be used with EPDM roofing/waterproofing membranes (except white or gray versions), due to too much carbon black, which interferes with the electrical current.

In summary, the advantages of EFVM compared to conventional flood testing are:

1. There is no risk of structural failure (due to the load of water necessary with flood testing).
2. Precise location of the leaks (with flood testing you only know where the water came out).
3. The wires can be left in place so that leaks can be found after the overburden is in place), by simply connecting to pig-tails left protruding).

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