



BUBBLE GUN TESTING OF SITE INSTALLATIONS

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The challenge an air barrier installer faces is that you cannot see air leaks. As an installer gains experience, they learn where the typical leakage areas are and develop ways to seal the leaks resulting in an airtight building envelope.

Making air leaks visible can be done anytime in any area you want to check (ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems). Of the different means on finding air leaks, one method is very suited

for the installer to use during or shortly after the air barrier installation or after penetrations are installed in the air barrier system): Chamber depressurization and leak detection liquids, commonly referred to as “the bubble gun test”.

The method uses a hand-held, portable pressure chamber comprised of a clear plastic dome “bubble gun” connected to a fan that can depressurize the dome’s volume when pressed against the surface. The installer can test a flat surface of any air barrier material. Fluid-applied materials require curing before conducting the test.

The equipment manufacturer provides detailed instructions on how to operate the equipment. If a continuous stream of bubbles forms, there is an air leak and it should be addressed per the supplier's instructions. The test is a qualifiable test suited for locating leaks on a building assembly where there is a lap of the material, fasteners, brick-ties, etc. The test is not suited to determine the air leakage rate of the material.

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1. LIQUID SOLUTION

The liquid solution provided by the equipment manufacturer is a specialized solution developed during the research project undertaken during the equipment development. A tester cannot substitute other leak detection solutions. The liquid solution has specific properties, including viscosity requirements. If it's too thin, the bubble could break before it reaches the surface; too thick and the bubble may not form at a specific pressure difference.

2. PRESSURE DIFFERENCE USED

The correct pressure difference to be used is 500 Pa. The viscosity of the leak detection fluid requires the 500 Pa pressure difference to create the bubble. Too much or not enough pressure and there can be false positives or false negatives. During the test ramp up to 500 Pa, leaks can occur at any time. A common misunderstanding is that people expect the test to be conducted at a 75 Pa pressure difference as they see that pressure reported in other tests.

3. WHAT CONSTITUTES A LEAK

A leak is a visible and continuous stream of bubbles from a spot in the assembly at any time during the ramp up to the 500 Pa pressure difference. If a suspected air leak point forms a bubble or a small number of bubbles—but the bubbles are not continuous—it is not considered an air leak. The reason is that there could be a small amount of air in a path that has a closed end. The pressure difference can pull the small amount of air out of a cavity and produce a few bubbles. In cases where there is a continuous stream of bubbles, the relative size of the leak can be made based on the size and speed with which the bubbles form, keeping in mind this is very subjective.

4. PASS/FAIL CRITERIA

The test's purpose is to make visible air leaks where there is a visible continuous stream of bubbles, indicating a leak. No bubbles, no air leaks. The test does not imply a failed air barrier system if a leak is detected.

For training purposes, it makes the invisible air



The equipment has two purposes: One for training air barrier installers and the other for site quality control.

leak visible. The installer can test their work when installing the air barrier material and accessories. For example, the installer seals around a brick tie, then tests their work. If they see a continuous stream of bubbles, they inspect the installation to pinpoint the exact leakage area. The installer modifies their installation process, then tests again. Suppose the modified installation process results in no air leaks. In that case, the installer now has an installation methodology that, if replicated, should result in no air leaks in the air barrier system. Having immediate feedback on the result of the installation methodology helps the installer learn correct installation practices.

For site quality control, the procedure finds air leaks; and the tester should mark these areas so they be properly addressed. Please note a building assembly and the air barrier system are not required to be completely airtight. The bubble gun test is qualifiable—but not a quantifiable test. The air leak is visible utilizing the bubbles, but the air leakage rate is not measured. Using no visible air leaks in the whole air barrier system as a pass/fail criterion is inappropriate. The ASTM E3158 test method provides the air leakage rate of the air barrier system and determines the pass/fail of a specific building.