



# Verifying Instructions in the Lab

BY JOHN LEWIS

**W**hen air or water leakage occurs at the wall plane of newly occupied buildings—possibly leading to liability claims—windows can be the prime suspects. However, where problems occur, it is not necessarily due to faulty design or manufacturing of the window product, particularly when it meets industry standards.

## Instructions are Crucial

As rigorous as door and window standards and tests are, these standards and tests do not account for the performance of the window after installation, which gives rise to an oft-stated axiom that a window is only as good as its installation. Even the best-designed product can fail if installed improperly. It was this understanding that propelled the development of ASTM E2112 as well as the AAMA-founded InstallationMasters™ Program.

Despite its importance, installation quality is inherently variable, depending on the experience and expertise of the installer. Codes only go so far as to state that installers shall follow the manufacturers' written installation instructions.

How can a manufacturer be sure that its installation instructions are sufficient to ensure designed product performance? If a problem is discovered later, is it the installer's fault for not following the instructions, or is it the manufacturer's for providing insufficient instructions? Rather than waiting for a liability lawsuit to sort this out, the key is testing to verify post-installation performance in conditions that simulate the real-world environment accurately.

In all cases, the essential principle of window installation is that the window must work together with the exterior facing material, sheathing and the weather-resistant barrier (WRB)—house wrap, for example—to form a fully integrated and effective drainage plane. The proper use of flashing and sealants in the installation process plays a key role in achieving this objective, and manufacturers' instructions should ensure that this happens.

## Verifying the Installation

There are recognized methods for checking performance after installation, such as those set forth in *AAMA 502-08, Voluntary Specification for Field Testing of Newly Installed Fenestration Products* (see this column in the June 2008 issue). This method checks newly installed products so that any problems can be detected and corrected before a project is completed. But verifying installation methods earlier in the product delivery pipeline could help forestall such problems entirely.

Manufacturers can do just that by following the product test method *AAMA 504-05, Voluntary Laboratory Test Method to Qualify Fenestration Installation Procedures*, which addresses the installation of windows and sliding patio doors used primarily in residential or light commercial buildings.

To prepare for the test, a direct-set a 4- by 4-foot double-glazed fixed window is mounted per its manufacturer's instructions in the center of an 8- by 8-foot wall section constructed of 2-by-4 studs.

The rough opening (RO) for the window unit consists of a double 2-by-6 header and a 2-by-4 sill plate, with cripple studs above and below. It must be large enough to leave a 3/8-inch gap between the RO and the perimeter of the product to allow observation of any water leakage from the inside. Areas around the RO are covered with 1/2-inch plywood or Oriented Strand Board (OSB) and a WRB material. Sealants used to install the window in the test opening must meet applicable AAMA requirements and must be applied per the sealant manufacturer's instructions. Flashing must be installed per the InstallationMasters training manual or ASTM E2112.

The test sequence begins with physical loading and temperature cycling conditions to simulate the actual in-service environment, then captures measurements of air leakage and water penetration per ASTM E283 and ASTM E331, respectively. These tests are repeated after durability testing, consisting of 14 twelve-hour test cycles per ASTM E2264. Finally, structural load capacity is tested per ASTM E330.

Manufacturers interested in avoiding potentially costly problems in the field should consider testing to AAMA 504 to validate their installation instructions. **I**

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