



# Architectural Testing 'For the Record'

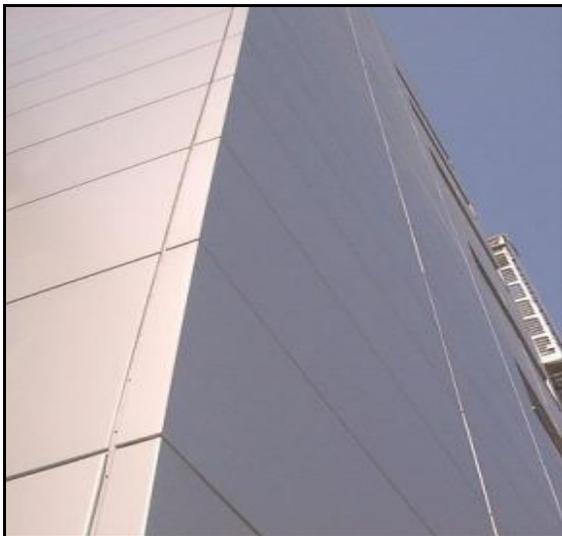
January 2010

Informational Bulletin

Bulletin #51

## Rain Screen Wall Cladding Systems Testing

Manufacturers of exterior wall cladding systems (a.k.a. panel systems) have long desired a standardized way of testing and comparing the performance of their products. Their need has been to provide a reference standard for architects and specifiers to write their products into project specifications. In the past, testing was typically conducted in accordance with industry recognized ASTM standards, but there has not been an established specification which promoted a standard specimen size, configuration, set of performance criteria or method of classifying a product's performance.



**Figure 1: Exterior Wall Cladding System**

Furthermore, the ASTM test methods for air and water leakage do not recognize the importance of being able to “see behind the

cladding” in order to better understand how the system functions or performs.

*For Example: How do you judge whether a system is functioning as a “Pressure Equalized Rain Screen” or a “Drained and Back Ventilated Rain Screen” if your pass/fail criteria is based solely on water penetration THROUGH the supporting back-up wall? (See Figure 2)*



**Figure 2: Clear Plastic Air/Water Barrier (AWB)  
(Allows observation behind the cladding system)**

### **AAMA responds to “The Call for Help”!**

Manufacturers knew that they needed a better way of testing their products, but perhaps more importantly they were also willing to put in the effort to develop the specification. One important link was missing though; they needed an industry organization to sponsor the effort, since

there is no “Cladding Manufacturers Association”. Some of the manufacturers were already members of the American Architectural Manufacturers Association (AAMA), and because they also made fenestration products to complement their cladding systems, they approached AAMA for help. The AAMA membership recognized this as an opportunity and assigned it to a task group to work on the project.

### Developing the Test Methods

Architectural Testing’s own Scott Warner – Executive Vice President; who was already leading AAMA’s “Methods of Test Task Group,” took on the challenge of leading the effort. As with any endeavor of this magnitude, the group met independently numerous times over several years to accomplish their task.

In addition to the many meetings the study group also embarked on extensive research testing to validate the proposed test methods; often making hard decisions along the way, in order to develop the best possible test methods for their industry. The hard work paid off and we now have two different test methods for two very different types of cladding systems.

### Two Test Methods Developed

The new test methods that were developed, approved and published by the AAMA are known as:

**AAMA 508-07**, “*Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems*” and

**AAMA 509-09**, “*Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.*”

As the names imply, there is quite a bit of difference between the two standards; after all, the systems are designed to function differently so performance needs to be

judged differently. Before we examine the differences, let us take a look at the similarities:

- Both test methods establish a standard specimen size and configuration, requiring an 8 foot by 8 foot square mock-up with at least one vertical and one horizontal joint between panels (See Figure 3)

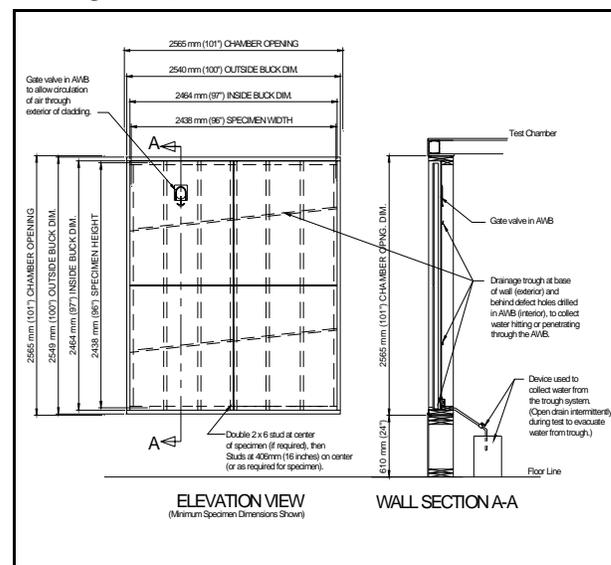


Figure 3: Example Mock-up Configuration

- Both test methods allow for testing with a “generic” air/water barrier (AWB), essentially a clear plastic sheet (i.e. Lexan) which allows for visual observation from the interior side of the specimen;
- Both test methods require purposely designed defects (holes) in the generic AWB, for the purpose of understanding the systems performance when applied over an imperfect air barrier. The notion is that under real world conditions, the air barrier isn’t perfect, and introducing a pressure change across the AWB will serve to create conditions that better emulate what will most likely occur in the field.
- Both tests methods allow for the option of structural testing, when using the actual AWB intended for a given job or system design, but the default is the generic AWB.

That is where the similarities end. What follows is a simplified breakdown of the differences between the test methods and the unique performance attributes of each.

### AAMA 508-07

This test method is intended for products that are defined by the manufacturer as being “*Pressure Equalized Rain Screen Wall Cladding Systems*” – panels systems, not to be confused with fenestration products.

According to the standard there are four (4) essential design requirements:

1. Water entry through the entire wall shall be prevented;
2. If water vapor diffuses through the interior wall construction (from the inside out) then it shall be vented to the exterior;
3. The actual AWB (when tested) shall be designed to resist the full positive and negative wind load;
4. The system shall be designed such that it doesn't trap or hold concealed water and that it is able to control rain water.

In terms performance, the AAMA 508 test method pass/fail criteria is...

- Failure is defined as water mist or droplets appearing in excess of 5% of the AWB surface; and/or
- Water running in a continuous stream (streaming) down the AWB surface.
- The assembly is also tested to determine if it behaves as a pressure equalized system, which for this test method is based on the lag time between the cyclic wind pressure and the cavity pressure. The lag time shall not exceed 0.08 seconds.
- Finally, the maximum differential between the cyclic wind pressure and the cavity pressure shall not exceed 50% of the maximum pressure when tested at 25 psf for 100 cycles.

### AAMA 509-09

This test method is intended for products that are defined by the manufacturer as being “*Drained and Back Ventilated Rain Screen Wall Cladding Systems*”. In this case it is understood that water will most likely reach the AWB; and that is acceptable. The question is how much water and whether the system is capable of allowing for subsequent drainage and drying.

The four (4) essential design requirements for drained and back ventilated systems are:

1. Water entry through the entire wall system (penetrating the AWB) shall be prevented;
2. The AWB shall be designed to provide the primary weather protection;
3. The system shall be designed to manage and drain any water entering the cavity behind the cladding and shall be sufficiently vented to allow the cavity to dry;
4. If water vapor diffuses from the building interior through the AWB and into the drained and back ventilated system cavity, it shall be permitted to be vented and/or drained out to the exterior.

The big difference with AAMA 509 is that other than not allowing water penetration through the entire wall system, there are no other pass/fail criteria. Remember that we expect water to reach the AWB. This is a matter of risk that the specifier needs to understand. That is, the AWB becomes the primary sealing line of the envelope as the rain screen (exterior cladding element) is there to shed bulk water. The question is, “How much water contacts the AWB?” and further, when water contacts this surface, “Is the system capable of venting and drying over time?”

So instead of pass or fail, AAMA 509 is unique in that it establishes a classification system which is based on the results of a set of performance tests that are obtained during testing.

The classification system allows for comparison between products. The performance measurements obtained are:

- The amount (volume) of water that is collected off the AWB and;
- The air flow measurements across the cladding elements.



**Figure 4: Gutter Behind Cladding System at Sill of Drained and Back Ventilated Rain Screen Wall Cladding System (Allows for Collection of Water on Face of AWB)**

To clarify, the test method incorporates a drainage gutter at the sill, (*See Figure 4*) as well as gutters behind the purposely designed defects/holes in the AWB to collect any water that runs down or through the AWB respectively. This water is then measured after each of four water tests; two static and two dynamic, and the average liquid ounces per square foot that contacts the AWB is calculated. Air flow is similarly determined by measuring each cladding joint and then determining the systems capacity to allow for free air flow which equates to drying potential. This data (“W” for Water and “V” for Ventilation) is then plotted on a chart and a “W-V” classification is obtained.

The architect or specifier can then compare and select the system based on the potential wetting and drying of the AWB as determined by the classification.

### **Caution – Know Your System**

Neither of these test methods addresses other types of cladding systems, such as “Face Sealed Cladding” or “Drained Cavity Walls”, and perhaps there are others, as these specifications and test methods have yet to be developed. It is very important that the manufacturer submitting a product for testing have an understanding of their system and how it is intended to function. Does it function as a pressure equalized system? Is it a drained and back ventilated system? Is it face sealed? Answering this question early on helps set the stage for a successful test, one that is designed to measure the performance of the system based on its intended function.

### **Conclusion**

This bulletin outlines the basics of what these two new standards entail. Those interested in learning more are encouraged to visit the AAMA Publications Store to purchase copies of these standards. As always, the professional staff at Architectural Testing is available to answer any questions or concerns that you may have.

### **Need More Information?**

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**Corporate Headquarters**  
**Architectural Testing, Inc.**  
130 Derry Court  
York, PA 17406-8405  
Phone: 717-764-7700  
Fax: 717-764-4129

