

# FEATURE TECHNICAL ARTICLE

IMPACTS OF THE AIR BARRIER ON BUILDING PERFORMANCE

by Mr. Laverne Dalgleish

# **4TH QUARTER NEWSLETTER**



Have you thought about why you buy what you do? Is it because it is the least expensive item available that should do what you are looking for, or do you weigh your options on cost, performance and what that item really provides you? I have focused on Quality in Construction now for over 25 years, and it still amazes me how an Owner expects a dry building every time they build, yet failures in the building enclosure is a multi-BILLION-dollar annual issue (except maybe for the lawyers) in our industry. Would you let your neighbor go and fix the brakes on your 16 year old's car when he has never touched a wrench in

his life? No way, but we hear it, almost daily, there is a labor shortage of qualified installers, and yet one of the primary purposes for the ABAA is to provide trained installers and a quality assurance program to mitigate this risk of enclosure failures.

When I was first forced to use ABAA's QAP – I resisted, I did not understand what was being asked, or better stated, demanded of our project by the Architect (Thank you to Mr. Wagdy Anis for sticking to the ABAA QAP requirements) at the onset of that project. After running the program, I began to understand, in order to really give the owner what they are expecting (a dry building), we needed to elevate the performance of the installation of the primary vapor retarder, air and water barrier layer. We needed:

- Products that were robust and met the needs of a construction site
- Products able to last the lifetime of the building
- Installers whom not only could install a product, but who understood the importance of that layer so they could ask questions in meetings and help make sure the primary layer had every chance to succeed for the project
- A trust but verify assurance program to ensure the products were being installed properly

The ABAA is here to help you with your projects by reducing your risks with providing the industry with trained professionals who use materials that have been evaluated to industry standards and provides a quality assurance process to help you provide that owner with enclosure that does not leak.

In closing, I hope all of you can take time this holiday season to spend with friends and family. Thank you from the ABAA for working with us to better the construction industry and we wish you all the best this holiday season!

#### **Brian Stroik**

Chair ABAA

Tremco Sealants and Waterproofing

Manager: Building Envelope Solutions Team



air barrier

aba
association of america

## IMPACTS OF THE AIR BARRIER ON BUILDING PERFORMANCE

by Mr. Laverne Dalgleish

Air leakage in buildings has serious consequences and we are just beginning to understand their extent. Air leakage in buildings impacts almost every aspect of the building's performance. All the following building envelope issues are positively impacted using a single set of air barrier materials.

#### **MOISTURE**

Moisture in buildings is at the top of the list for causing moisture problems. It is one of the predominant problems that result in insurance payouts. Moisture causes premature building failures, increased maintenance costs and too-early replacement of the building.

Moisture can result from liquid moisture getting into the building due to the water not being shed from the building with the use of roofing materials, water resistive barriers, flashings, and waterproofing. Moisture caused by standard construction methods – materials stored outdoors, moisture from paint and adhesives as they dry - can leave building materials with high moisture content which can lead to problems.

We now understand that water damage in buildings may not be caused by liquid water coming from the outside but rather water vapor infiltrating the building assemblies and then condensing. When the damage is discovered, the water is in a liquid state and one may not immediately think of air leakage being the cause. The most common reaction is to think that the water is a result of vapor transmission through the material.

It may be water vapor, but a vapor barrier does not solve the problem as, in most cases, it is the air leakage that carried the water vapor to the area where the vapor condensed into its liquid state.



This brings to mind the person who calls the roofing company in late winter, after having had no rain for four months and with no snow melting on the roof and demands that the company come to fix the "roof leak". One roofing company got so fed up with being blamed for shoddy workmanship, when they had done a nearly perfect installation of the roofing materials that they refused to start installing shingles until all air leakage into the attic was corrected.

When the outside temperature is colder than the interior temperature, warm moist air from the inside can leak through the holes and cracks to the area where the first plane of condensation is found, and the vapor turns to liquid. When the inside temperature is colder than the exterior temperature, warm moist air from the outside can leak through the holes and cracks to the area where the first plane of condensation is found, and the vapor turns to liquid. It does not matter where you live, in the north or in the south, you will typically see both warm and cold atmospheres every year.

### FEATURE TECHNICAL ARTICLE CONTINUED..

### IMPACTS OF THE AIR BARRIER ON BUILDING PERFORMANCE

by Mr. Laverne Dalgleish

Use of an air barrier system in a building reduces moisture problems where the climate is hot and humid. The amount of moisture transport by air leakage is greater in hot and humid climates then in cold and dry climates.

Moisture in buildings causes mold growth, decay, rot, and corrosion that lead to structural problems,

durability issues, increased maintenance costs, building devaluation, health problems of the occupants and the list goes on.

A complete air barrier system in a building goes a long way for managing moisture problems in a building. Many air barrier materials and accessories can also a water resistive barrier to provide additional protection.

<b>Building Component</b>	Residential (quads)		Commercial (quads)	
	Heating	Cooling	Heating	Cooling
Roofs	1.00	0.49	0.88	0.05
Walls	1.54	0.34	1.48	-0.03
Foundation	1.17	-0.22	0.79	-0.21
Infiltration	2.26	0.59	1.29	-0.15
Window (conduction)	2.06	0.03	1.60	-0.30
Window (solar heat gain)	-0.66	1.14	-0.97	1.38

#### **ENERGY USE**

We don't always want the indoor environment to be the same as the outdoor environment. To make ourselves comfortable, we add or subtract heat and we add or subtract moisture from the air inside the building. When this conditioned air exits from the building, the air has to be made up by bringing in outside air which then needs to be conditioned. To condition the air, we use energy to add or subtract heat or to add or subtract water from the outside air. The more air leakage in a building, the more air we need to condition and therefore, the more energy we use.

The National Institute of Standards and Technology reports that the added energy to heat and cool

buildings due to infiltration and exfiltration of air can be anywhere from 10% in cooling climates to 42% in heating climates (NISTIR 7238).

The Building Technologies Office Multi-Year Program Plan in 2010 showed that air infiltration in buildings results in primary energy consumption of 2.26 quads for heating and 0.59 quads for cooling for residential buildings. For commercial buildings, infiltration results in primary energy consumption of 1.29 quads for heating and -0.15 quads for cooling. Reducing air leakage rates in buildings has a great impact on reducing energy use. Currently the highest impact on reducing energy use as double digits whereas almost all other energy saving measures results in single digit savings.

# PULL ADHESION – THE NEED FOR A TEST METHOD FOR THE AIR AND WATER RESISTIVE BARRIER INDUSTRY

by Mr. Laverne Dalgleish

The Air Barrier Association of America (ABAA) QAP requires that the installer tests the adhesion of the installed air and water resistive barrier (AWB) material daily. When an ABAA audit is conducted, an adhesion test is performed to confirm that the installer is conducting the test properly and the results of the tests are documented in the audit report.

ABAA has established minimum pull-off value of 16 psi for AWB materials as a part of the material evaluation process. ABAA has not yet established a minimum pull-off value in the field. When ABAA's QAP was introduced, the closest test method that was published by a standards development organization was ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers. ABAA adopted this method for evaluating pull adhesion, but through the audit process, became aware that results may not be repeatable or reproducible due to the various modifications incorporated by different installers, namely, the size of disks, variations in the rate of the pull and whether scoring around the disk occurred. For example, a simple thing like rate of pull can produce a different pull-off value. If you use the rate of pull suggested in ASTM D4541, you will get a different number than when using a hand crank and turning it very slowly.

With air and water resistive barrier materials, it is also important to determine where the failure occurred. The installer needs to prove that the material installed stuck to the substrate or if a failure within the substrate occurred. If there was a substrate failure, for example the facing releasing from a gypsum board, that needs to be recorded, but it is not considered to be a failure of the installation of the air and water resistive barrier material.

As the industry evolved, it was apparent that there was a need to develop a test method that was specific for the air and water resistive barrier industry. The ABAA Research Committee worked on the development of an air and water resistive barrier test method, which documented the current practice in the industry but standardized the process. Careful consideration was given to develop a test method that could be used both in the laboratory and in the field so that the manufacturer's test results could be compared to field results.

The test method was vetted by the ABAA Research Committee and approved. The document was then submitted to the ABAA Board for final approval as an ABAA document. The result of this work is the published document ABAA T0002-2019 Standard Test Method for Pull-Off Strength of Adhered Air and Water Resistive Barriers Using an Adhesion Tester. The document can be found at;



#### https://bit.ly/2qKpnNN

ABAA requires that the installers and the auditors use ABAA T0002 as of January 1, 2020. The grace period is intended to allow time for contractors to procure equipment and installers to become familiar with the changes.

This test method is a step forward in the evolution of the air and water resistive barrier industry. As the test method reflects what is already been employed in the industry, and the industry has had a chance to use the ABAA method, the document will be presented to ASTM to become an ASTM standard.

### MEMBER EXTERNAL ARTICLE

# **ROLE OF WRB - IN OPEN-JOINT CLADDING DESIGN**

by Mr. Peter Barrett

Open-joint cladding enhances the visual appeal of buildings. However, it exposes the exterior wall to wind, water, and ultraviolet (UV) rays, thereby risking havoc to building performance and causing the growth of mold and rot within the wall cavity. Applying the right barrier in the appropriate place can help building professionals protect their designs well into the future and improve the overall performance as well as the appearance of a structure.

To continue reading the article written by one of ABAA's Board of Directors, Mr. Peter Barrett, click the following link. Mr. Barrett's article was recently published in the April 2019 Construction Specifiers magazine.



## REGIONAL UPDATE

# UPCOMING CODE CHANGES IN THE STATE OF WASHINGTON

by Mr. Ryan Dalgleish



THE STATE OF WASHINGTON WILL BE THE FIRST STATE TO REQUIRE NOT ONLY WHOLE BUILDING AIRTIGHTNESS TESTING ON COMMERCIAL BUILDINGS, BUT ANYTHING ABOVE A CERTAIN PERFORMANCE CRITERIA WILL SIMPLY NOT BE ACCEPTABLE ANY MORE.

Over the past number of years, whole building airtightness testing has been a requirement in certain jurisdictions in the State of Washington. Since 2009, whole building testing was a code related requirement, but the performance of what a "pass" meant was not well understood, nor was there really much in regards to implications of not meeting a defined performance requirement. The code was subjective when it came to the whole building airtightness test not passing, indicating that a "visual inspection had to be conducted and any noted leaks has to be sealed to the extent practical. The report of remedial action was to be submitted to the owner and code official and any further requirements to meet the leakage air rate was waived."

Another test to see how well the remedial work achieved a higher level of airtightness was not required.

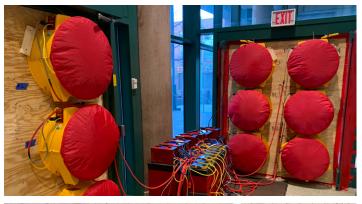
The performance requirements were as following for whole building airtightness:

- 2012 Edition of Code: 0.04 cfm/sf
- 2015 Edition of Code: 0.3 cfm/sf

In the 2018 edition of the State code adoption, which provided amendments to the International Energy Conservation Code (IECC), the requirements were changed to a higher performance target and a more clear prescriptive outline of what needs to be done if the building does not meet the target.

# SECTION 402.5.1.2 OF THE WASHINGTON STATE ENERGY CODE (WESC) PROVIDED THE FOLLOWING LANGUAGE:

The completed building shall be tested and the air leakage rate of the building envelope shall not exceed 0.25 cfm/ft2 at a pressure differential of 0.3 inches water gauge (2.0 L/s • m2 at 75 Pa) at the upper 95 percent confidence interval in accordance with ASTM E 779 or an equivalent method approved by the code official. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the building owner and the Code Official. If the tested rate exceeds that defined here by up to 0.15 cfm/ft2, a visual inspection of the air barrier shall be conducted and any leaks noted shall be sealed to the extent practicable. An additional report identifying the corrective actions taken to seal air leaks shall be sub-mitted to the building owner and the Code Official and any further requirement to meet the leakage air rate will be waived. If the tested rate exceeds 0.40 cfm/ft2, corrective actions must be made and the test completed again. A test above 0.40 cfm/ft2 will not be accepted.





The two major items with this change are the target rate for air leakage (0.25 cfm/ft2) and that if the result exceeded 0.40 cfm/ft2, it needed to be rectified and re-tested. Anything above 0.40 cfm/ft2 would NOT be accepted.

The State of Washington will be the first state to require not only whole building airtightness testing on commercial buildings, but anything above a certain performance criteria will simply not be acceptable any more.

The association will be working with our membership and the industry to help prepare for these upcoming code changes and help organizations meet and exceed these performance numbers. We will be doing this through offering education, technical support, communication and tools.

We are told that this code change will go into effect in the summer of 2020, so only about 6 months away.

# TRAINING & EDUCATION

# UPCOMING EVENTS

## ABAA EVENTS

#### BUILDINGS XIV - CLEARWATER BEACH, FL

Workshop 1: No Way, That's Impossible

Workshop 2: Fun in the Lab: Air and Moisture Leakage Calculator

Dec 8, 2019 (Workshops are on Sunday, 8am - 12pm)



#### SELF-ADHERED & FLUID APPLIED TRAINING

Jan 28-30, in Huntington Beach, CA

#### SPRAYED POLYURETHANE FOAM INSTALLER TRAINING

Feb 11-12, in Pasadena, CA

#### FIELD AUDITOR TRAINING

Jan 14-16, in Dayton Beach, FL



AIR BARRIER EDUCATION

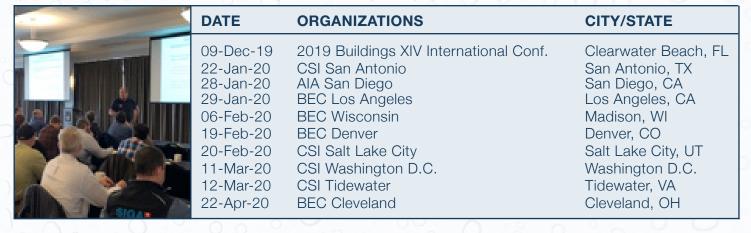
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FOR INFORMATION ON PROGRAMS AND REGISTRATION DETAILS, PLEASE VISIT THE ABAA WEBSITE HERE:

www.airbarrier.org/education/installer-courses/

### SYMPOSIUM AND PRESENTATION SCHEDULE



### **SPEAKING & INDUSTRY EVENTS**





#### **Net Zero Conference**

ABAA had a booth at the world's largest net zero building conference and largest annual green building event in California this past October. The show allowed us an opportunity to promote ABAA to local architects and network with other industry professionals.

# Specification Consultants of Independent Practice

ABAA had a tabletop booth at this great event. It was well attended and continued to help the association work with specifiers and provide support to them. This was the first year that we had participated and is definitely something that the association should continue to do.



#### **Advancing Construction Quality Conference**

ABAA sponsored and exhibited at this conference in Nashville, TN, dedicated to tracking and proving the value of quality and improving quality management practices. Ryan Dalgleish managed the booth and Brian Stroik presented, giving the ABAA good visibility and a chance to network with industry stakeholders. Hundreds of architects, engineers and contractors turned out for the event.

#### **Construct Show**

ABAA once again was present and had a booth at the Construct Show in Maryland, which is affiliated with the Construction Specifications Institute (CSI). The trade show booth was manned by Ryan and Tamara, who were on hand to discuss technical issues, education opportunities and the association's quality assurance program that can be specified for construction projects. This is one of the shows that ABAA has participated in for a number of years to continue to provide a resource to the specification community. A number of our manufacturer members were in attendance also, and provided assistance on air barrier materials to attendees.

#### **BEC Detroit**

ABAA had another strong networking and promotion opportunity by exhibiting at the Building Enclosure Conference in Detroit, where our very own Roy Schauffele gave a highly praised presentation on Roof to Wall Connections. ABAA had a table top booth with lots of traffic and we were happy to support this event.

# WHAT HAS ABAA BEEN UP TO? CONTINUED..

# **SUMMARY OF EDUCATIONAL EFFORTS FOR 2019**

**3,373** 

# OF EVENTS

4,917

ABAA INDUSTRY RECENT PRESENTATIONS

(SEPT - NOV)

DATE	FACILITATOR	AUDIENCE	TOPIC
5-Sep-19	L. Dalgleish	CSI Chicago	Round Table & A Sticky Subject
1-Oct-19	B. Stroik	Advancing Construction Quality Conference	Construction Cautions
2/3-Oct-19	R. Schauffele C. Wetmore A. Dunlap L. Dalgleish	CSI Dallas	Symposium
8-Oct-19	L. Dalgleish	BEC, CSI Minnesota	Air/Moisture Barrier Advancements and Coming Industry Change
11-Oct-19	R. Dalgleish	Construct Show	How to Properly Specify an Air Barrier
15-Oct-19	R. Schauffele	BEC-GD 2019 Enclosure Consciousness	Roof to Wall Connections
15-Oct-19	L. Dalgleish	CSI Fresno	How to Properly Specify an Air Barrier
16-Oct-19	L. Dalgleish A. Dunlap	PG&E, AIA San Francisco	Symposium
17-Oct-19	L. Dalgleish	CSI Sacramento	Expanded How to Specify an Air Barrier
18-Oct-19	L. Dalgleish	CSI / AIACV Forum	Building Science and Air Barrier Design
29-Oct-19	R. Dalgleish A. Dunlap C. Wetmore B. Stroik	AIA/BEC Indianapolis	AIA/BEC Indianapolis Symposium
12-Nov-19	R. Schauffele	CSI Baton Rouge, LA	Roof-to-Wall Connections
13-Nov-19	R. Schauffele	CSI New Orleans, LA	Roof-to-Wall Connections
14-Nov-19	R. Dalgleish	AIA Minnesota	Trust, but Verify! QC for Your Air Barrier





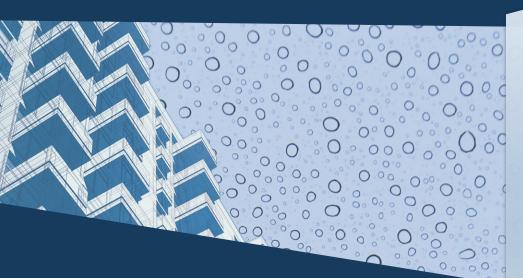
2019 BUILDINGS XIV CONFERENCE Sheraton Sand Key Clearwater, FL | December 9 - 12, 2019

ABAA is proud to sponsor the "Buildings Conference," which takes place every three years allowing time to develop new research and technology applications and to document the findings. Attendance is international and draws heavily on the advanced technical knowledge of all our global experts. The "Buildings Conference" presents a great opportunity for product manufacturers, research groups, technical advisors, builders, designers and other consultants to discuss their work achievements, interest and awareness of buildings issues, and provides solutions to some of our major building problems.



# CSI ANNUAL MASTER SPECIFIERS RETREAT

The Langham Huntington Pasadena Los Angeles, CA | January 29 - 31, 2020 ABAA will be in attendance at this exclusive event that brings together senior specifiers and product selection influencers from across the country for an intimate experience of focused education, group networking, and one-on-one meetings with building product manufacturer executive.



air barrier

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BUILDING
ENCLOSURE
CONFERENCE

## AIR BARRIER EDUCATION AT THE HIGHEST TECHNICAL LEVEL



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**LOCATION: THE HYATT REGENCY RESTON** 

# HAVE AN INDUSTRY RELATED ARTICLE YOU WOULD LIKE TO SEE FEATURED IN OUR NEWSLETTER?

Submit it to us for review and you could see your work published in the next newsletter! Also, we would love to hear your feedback on our newsletters and any content you want to see more or less of?

Email it to us at: abaa@airbarrier.org