air barrier

# abaa

association of america

1ST QUARTER NEWSLETTER

## FEATURE TECHNICAL ARTICLE

## INSULATION R-VALUE – IT'S NOT WHAT YOU THINK

by Laverne Dalgleish

# GREETINGS FROM THE CHAIR

## 1ST QUARTER NEWSLETTER

Can you believe it has been almost a year since our 7th annual ABAA Conference? Well it has, and a few weeks ago, we just hosted our 8th Annual Conference in Norfolk, VA on March 26-28.

I am very excited to say that the Conference Committee put together another outstanding event with the top experts in building science from across the country. The presentations provided an in-depth review of building enclosures, moisture management, air barriers, sustainability, and building enclosure commissioning.

As part of this, we really want to express our appreciation to our member sponsors of the conference. Thank you for your support on this very important event. Without the support of our members, we would not be able to host such a great event.

It has been an exciting time for our association over the past year. It is with great pleasure that I can announce that ABAA hit a record for membership in 2018. Over 500 companies belong to the association (513 to be exact). The membership includes a great mix of manufacturers, contractor sub-trades, consultants, inspectors, design professionals and others. A truly fantastic accomplishment and it is inspiring to see the support from the industry. The increase in membership continues to establish us as the national voice of air barriers. I would like to sincerely thank each and every member for the support and look forward to this time next year where we can report on another membership record.

One of our strategic initiatives this past year was to focus on expanding our education to the industry. In 2018, we set another milestone for offering the most continuing educational credits to industry stakeholders. Over 15,000 hours of continuing education to the industry!

As part of the increase in education, the association continued to offer and expand its day long educational programs across the country. ABAA facilitated over 30 of these events and it was an absolute success.

I would like to sincerely thank all of the individual volunteers involved with this; Andrew Dunlap, Brian Stroik, Craig Wetmore, Roy Schauffele and David Altenhofen. Your time and dedication to our association and the industry is so greatly appreciated.

We have continued our regional advocate program and had another successful year with this initiative. The regional advocates are there to provide local support, education and assistance to the building community. Once again, Roy Schauffele, our regional advocate for Texas, went above and beyond expectations in serving the industry.

I had said in a previous article that “Time Flies”. Well, this still holds true. In a short while, my term as Chair of ABAA will be coming to an end.

It has been 3 of the best years of my life and I have met some unbelievable individuals that I now call friends. I am involved with a number of associations and can honestly say that the professionalism and dedication from everyone involved is unbelievable. Coming into the role was a little daunting, but with all of the support from every volunteer and the ABAA Staff, I was able to survive and hopefully continue the growth of ABAA as my predecessors had done. It has been an absolute pleasure working in this role and I am so thankful for the wonderful Executive Committee, Board of Directors, Committee Chairs, and every volunteer that I have been able to work with.

I am going to miss it, but guarantee that I will be continuing in my role on the various committees. One other guarantee is that the Association is in good hands for the future.

I also want to express a thank you to the ABAA Staff. I could not have gotten through this journey without all of you. You are the backbone of this Association and you end up working behind the scenes a lot and may not always get the recognition that you so well deserve. I would ask that anyone reading this, reach out to one of our management team and just say thank you. It would be a small gesture to recognize the work that the team does each and every day.

In closing, I again just want to say thank you to everyone and I look forward to seeing all of you at our 9th annual ABAA conference April 7-8, 2020 in Reston, VA.

Thank you,

Russ Snow
Chair

# ABAA AWARDS

## AWARDS CEREMONY RECOGNIZING SOME OF THE OUTSTANDING ACHIEVEMENTS OVER THIS PAST YEAR

Congratulations to **Mr. André Desjarlais** for being awarded the Wagdy Anis Award of Dedication. This is one of the highest recognitions in the air barrier industry. André is the Building Envelope Program Manager with Oak Ridge National Laboratory in Oak Ridge, TN and plays a very important role with ABAA in regards to research.

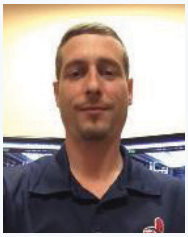
His involvement in the building industry of over 40 years has accounted for many merits and r ecognitions and is he is an active member of both the American Society for Testing and Materials (ASTM) and ASHRAE. ABAA was more than honored to present André with this award and to be able to recognize his achievements and successes! Andre is only the second person t o receive this award with Mr. Roy Schaufellle being a warded this last year at the ABAA conference.

*André Desjarlais recieving the Wagdy Anis Award.*

**CHAIRMAN'S AWARD - BOARD OF DIRECTORS YEARS OF SERVICE AWARD -** This is presented to any board member that finished their term and is coming off the board. Their time and commitment they have dedicated during their term as Director is greatly appreciated and each of them have played a significant part in the continued growth of ABAA.

This year, the award was given to **Len Anastasi**, who is one of the founding members of the association and was also one of the first board members of the association when it was established way back in 2001. We want to thank Len for his dedication to the board and association as a board member for over 17 years and being active in many committees, especially the conference committee.

**COMMITTEE CHAIR AWARD -** This award is to recognize any committee chair for the contribution and involvement in the committees.



This is such a tough award to decide upon as all of our committees are doing so much for the betterment of this Association. This year, it was presented to the Chair of the contractors committee. This committee has done a great deal of work over this past year under the leadership of **Matt Giambrone**.

ABAA Contractors Committee: would like to thank him for all his hard work and guidance Matthew Giambrone relating to all of our contractor member needs.

**STAFF RECOGNITION AWARD -** The last of the Chairman's Awards is theStaff Recognition Award, presented to any staff member that goes above and beyond.

This is a difficult choice, as all of the ABAA staff work extremely hard for the success of ABAA. This year the award was presented to **Peter Spafford**. Peter has been involved with ABAA since its inception and has trained thousands of installers and hundreds of auditors. Peter acts as the Quality Assurance Director to support the Quality Assurance Program and assist architects, general contractors, contractors and auditors with support, guidance and oversight.

# ABAA AWARDS

## CONTRACTOR AWARDS – QAP EXCELLENCE

This award is presented to ABAA Accredited Contractors who have successfully completed a minimum of 5 site audits in which they have been assessed no more than 30 total demerit points.

- George Moehrle Masonry
- Gleeson Powers, Inc.
- Phillips Interior Exterior Systems
- Spray Foam Technologies of KY
- Standard Waterproofing
- Stony Creek Services
- Superior Insulation Co., LLC
- Tailored Foam
- Western Specialty Contractors

## CONTRACTOR AWARDS – AIR BARRIER EXCELLENCE

Presented to an ABAA Accredited Contractor who has successfully completed a minimum of 5 site audits and been assessed a total zero demerit points.

- IWS, Inc.
- The Drying Company/ThermalTec

This is The Drying Company/ThermalTec's 3rd year in a row receiving the Air Barrier Excellence award.

*Joe Hogge, The Drying Company/ ThermalTec accepting the award*


# CHECK OUT OUR WEBSITE AND FIND:

LIST OF AIR BARRIER MATERIALS THAT HAVE BEEN EVALUATED

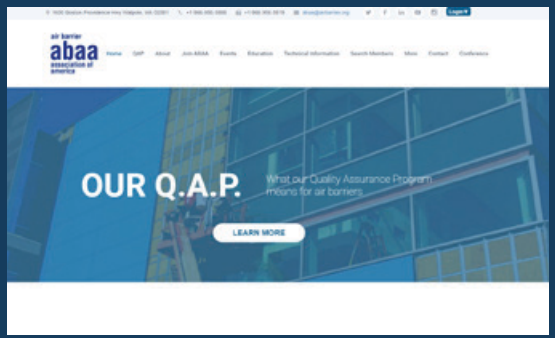
TECHNICAL PUBLICATIONS

FIND MEMBER CONTRACTORS, MANUFACTURERS, CONSULTANTS, TESTING LABS, AND ARCHITECTS

LIST OF EVENTS AND TRAINING

CLICK THE LINK BELOW TO ACCESS ALL THESE FREE RESOURCES, AND MORE.

**http://www.airbarrier.org**



TECHNICAL ARTICLE

# INSULATION R-VALUE – IT'S NOT WHAT YOU THINK

by Laverne Dalgleish

Those who work in building science have two obsessions in this country – R-value and vapor permeance – and we spend way too much time dwelling on them.

**R-value - bigger is better right?** No – for two reasons - we get to the law of diminishing returns and secondly, there is more to keeping the heat in our buildings than just R-value.

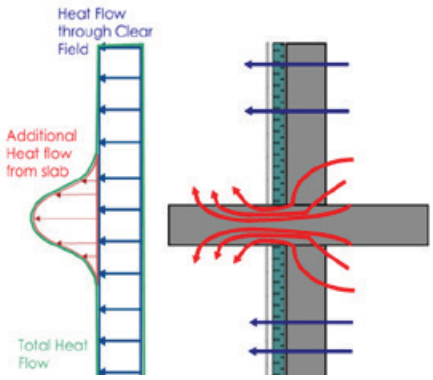
We reference R-value but we measure U-value to determine the flow of heat loss in our buildings. The rate of heat loss will determine how much energy we need to heat and cool our building.

## HEAT FLOW IN MATERIALS

We start with the physics that heat will always flow from hot to cold. The rate of heat flow is determined based on the characteristics of the material that heat will flow through. Materials that allow a lot of heat flow through them are called conductors and materials which slow the flow of heat through them we call insulators.


As we combine materials into a building assembly, each material will have a different rate of heat flow but the rates of each material will be summed to provide an overall U-value.

For instance, framing members will conduct heat much faster than an insulation product, like a batt of thermal insulation installed between. We refer to the framing members as a thermal bridge. The framing member will conduct heat from one side of the wall to the other side of the wall a lot quicker than it going through the batt of insulation.. Both the framing member and the framing material are typically covered with gypsum board on the interior and exterior sheathing and cladding on the exterior.




*Building Envelope Thermal Bridging Guide prepared by Morrison Hershfield Ltd.*

To be precise, we obtain the heat flow rate of each material based on its thickness and calculate the overall heat flow rate for the assembly of materials.

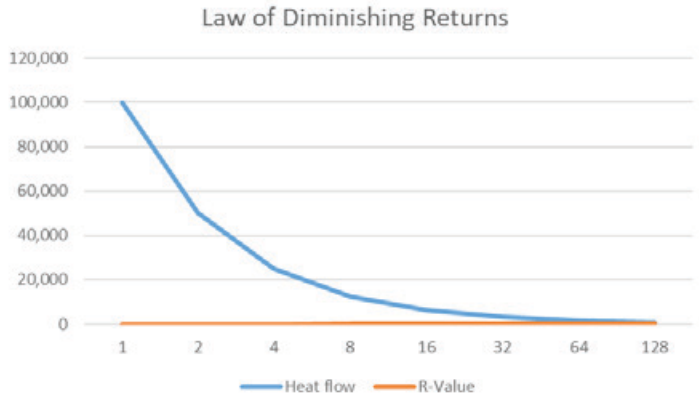
| Material | R-Value | U-Value |
|---|---|---|
| Fiberglass Batt | 3.14 | 0.32 |
| Cellulose Blown | 3.13 | 0.32 |
| Expanded Polystyrene | 4.00 | 0.25 |
| Extruded Polystyrene | 5.00 | 0.20 |
| Spray Polyurethane | 6.25 | 0.16 |

From those numbers we can calculate the overall U-value of that wall assembly and calculate how much energy in the form of heat that will flow through that wall or any building assembly. Although you can do the calculations manually, there are a number of computer programs that will do this for you in seconds. You do need to understand the defaults set in the modeling program as they may or may not represent your actual building assembly.

Most modeling programs deal in heat flow in one or maybe two dimensions whereas heat flows in four directions. It comes down to what is good enough for the building's needs.

All of this is done in U-value, so why do we switch to R-value. Well, we always think bigger is better. Selling less of something just doesn't seem right. My product is five and your product is ten but my product is better? We tend to think bigger is better. R-value is simply the inverse of U-value. U-value is how fast the heat flow (bigger is bad) whereas R-value represents how the material resists heat flow (bigger is good).

The law of diminishing returns basically says that to cut the heat flow in half, we need to double the R-value. If you plot this on a graph, you get a curve. As a zero R-value gives you infinite heat flow, we need to start with one R-value. No matter which unit you use for the amount of heat which would flow through a given area, the curve will be the same. So, if the heat flow at R1 allows 100,000 kWh to flow through the material and we double the R-Value to R2, we cut the heat flow to 50,000 kWh. Fantastic – that provides a great reduction in heat flow. Doubling the insulation value to R4 (we doubled the R-value) results in a heat flow of 25,000 kWh (cutting the heat flow in half). We can keep on doing this forever but you see the trend. Heat flow slows as R-value increases. Progressively doubling the R-value as




with R1 to R2, then R4, R8, R16, R32, R64, R12 progressively multiplies the slowing of heat flow.

This leads us to the significance of the thickness of insulation used. First, we want enough insulation to reduce or prevent condensation on a surface of a building a material that can lead to mold, mildew, rot, corrosion, etc.

Increasing insulation thickness does not necessarily mean that the building will be energy efficient. We might add insulation to reduce heat loss but at some point, the value of adding additional insulation does not really slow the heat flow down to any great extent. Keep in mind, that we never stop heat flow, we can only slow it down.

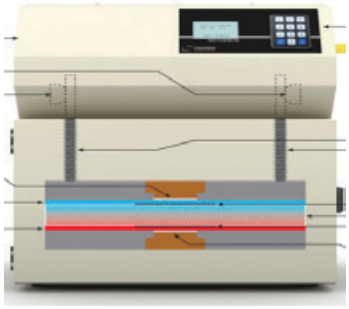
At around R40, you get to the point where you need to double the insulation to R80 simply to cut the heat flow in half. In this range, you have satisfied the need to eliminate condensation and you have a very energy efficient building as far as insulation goes.

## TESTING MATERIALS AT DIFFERENT TEMPERATURES

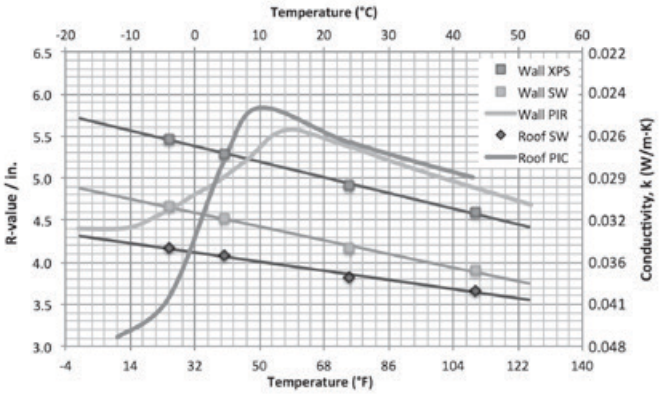
Now let's look at the temperature at which the material is tested. The rate of heat flow is dependent upon the temperatures on each side of the material. The interior temperature of your building may remain somewhat the same but the outside can differ significantly throughout the year. Change the temperatures on each side of the material and you change the heat flow and therefore the U-value and the R-value.

In this country, insulation materials are generally tested to ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

Basically, there is a hot plate and a cold plate and the energy moving from the hot side to the cold side is measured to determine the heat flow. It is normally called a guarded heat flow meter as the edges of the material are insulated so that the flow of heat through the material is in one direction.



We test the materials at a mean temperature of 75 ± 2° F (24 ± 1° C) with a temperature differential of 40 ± 2° F (20 ± 1° C). At 75° F, we probably do not need any insulation. The purpose of this test though, is to allow a person to compare materials, so the temperature used is not as important as the need for everyone to use the same temperature. We tend to use these results in modeling as being the same no matter what the inside and outside temperatures actually are. It is important to understand this and to decide how precise the test needs to be.




***Temperature-dependent R-value curves for roof and wall insulations studied. (The effects of Temperature on Insulation Performance: Considerations for Optimizing Wall and Roof Designs 2016 – Chris Schumacher, John Straube, Lorne Rickets, Graham Finch)***

Some materials will provide a better R-value at lower temperatures and other materials may provide a better R-value at higher temperatures. There is not a lot of information available to the public on the different R-values available for a material tested at different temperatures.

## HEAT FLOW BY CONVECTION

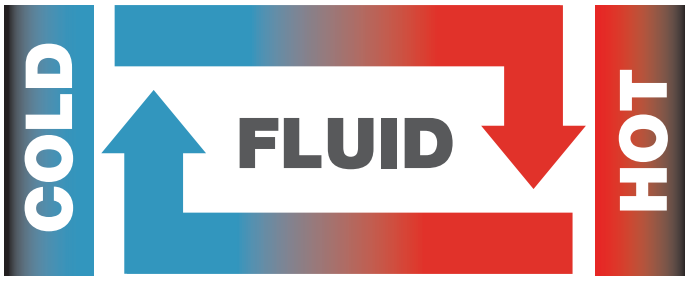
When a material is tested for its heat flow using ASTM C518, no air passes through the material. For some materials used as thermal insulation, no air can pass through the cavity in which they are installed. Cellular plastic insulation is one of these materials.

Other materials that have a high air leakage rate also allow for convection currents within a building cavity. Some fibrous materials are not considered thermal insulation but when made into a fibrous form are sold as a popular insulation. Glass is an example. As a solid material we call it a non-insulating material. When spun it into cotton candy it makes a good

insulation. This requires that the manufacturers make the length and the diameter of the fibers just right. If made too short in length and diameter, they can cause respiratory problems. Too long a fiber will enable more heat conduction.

If glass is not an insulating material, how does it magically change as we change the form of the glass? The answer is that the glass does not change, but changing its form does change how air flows in a cavity in which it is installed.

Air itself is an insulating material. So why don't we simply fill all building cavities with air (which automatically happens at no cost to us)? This gets back to how heat flows. One of the ways heat flows is by convection. Heat flow by convection is heat being transferred from one material to another material through a medium. The medium can be anything that flows. In this case, the medium is air. The air that is touching the cold surface becomes cooler and denser. This denser air falls to the bottom of the stud cavity and pushes warmer, lighter air




upward.

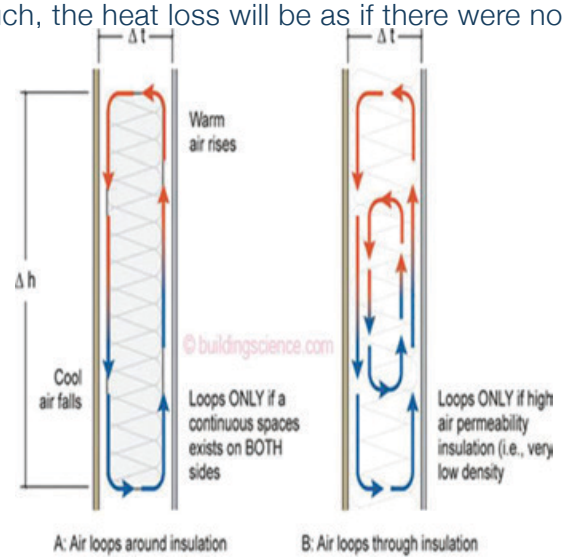
*This warmer lighter air then is in contact with the cold surface and the cycle continues. It is important to note that heat flow by convection happens much faster than heat flow by conduction. Although air is an insulator, if it moves in a convective current, it accelerates the heat loss through the stud cavity. Fibrous insulation slows this convective current or to stops it. To do this, the fibrous insulation has to be in*

*full contact with all six sides of the stud cavity.*

*With batt insulation, there can be gaps round the batt based on the way it has been installed. Convective currents decrease the insulating value of the insulation and therefore reduce the installed R-value of the insulation.*

## AIR LEAKAGE THROUGH MATERIALS

For all fibrous insulating materials, air leaks in the building envelope result in air moving through an insulation. Air that moves through an insulation diminishes or negates the insulation's value. If it is -20° C (-4° F) outside and that air is leaking into the building assembly and through the insulation, instead of the insulation doing its job and separating the interior air from the outside air, the exterior air can be coming in right to the interior gypsum sheathing. As such, the heat loss will be as if there were no




insulation installed.

## HEAT FLOW BY RADIATION

There will always be some heat flow by radiation. ASTM C518 does not deal with heat flow by radiation. Therefore, the installed R-value may be less than the tested R-value. Each material will have a different heat flow based on its radiation value.

There are some cellular plastic materials in the

marketplace that have carbon black added to help slow heat flow by radiation.

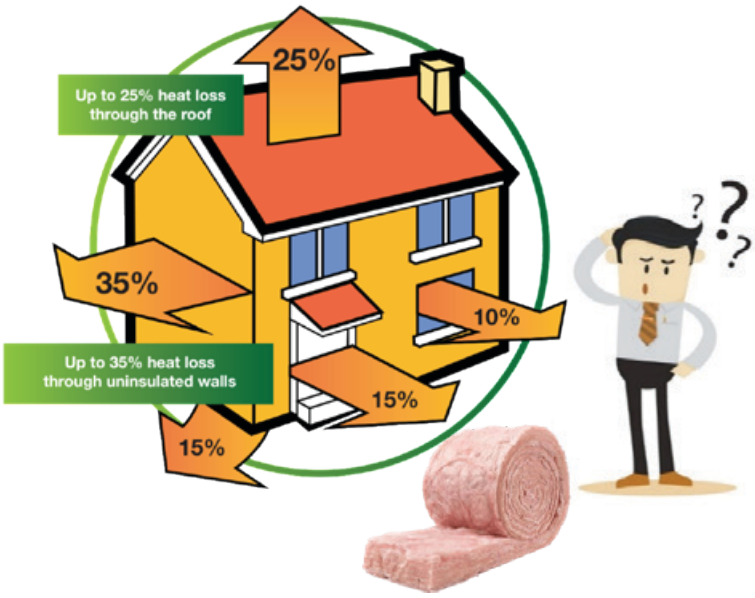
## LABORATORY R-VALUE DOES NOT EQUATE TO ACTUAL R-VALUE IN A BUILDING

The R-value you see on a bag of fibrous insulation is going to be the best R-value you will ever see for that material.

Once insulation is installed the R-value will change depending on the influence of:

- How the material handles heat flow by convection and radiation in addition to conduction
- Actual temperatures on each side of the insulation
- Whether there are convection currents in the framing cavity
- If there is air flow through the insulation

It is important to understand what you are buying and how the material performs when you select insulation for your project.




AUTHOR

Mr. Laverne Dalgleish specializes in Standards, Building Codes, Quality Assurance, Building Science, Building Envelope, and Personnel Certification.

He is the Executive Director of the Air Barrier Association of America working to champion energy conservation in buildings while educating the building owners and designers about the benefits of energy conservation such as durability, comfort, reduced maintenance, reduced HVAC equipment costs and the positive impact on the environment.

WHAT HAS ABAA BEEN UP TO?

# ABAA DEVELOPS FULL MATERIAL SPECIFICATIONS

by Laverne Dalgleish

Please note: *a material specification is not a project specification.*

The Air Barrier Association is updating the Material Evaluation Program by developing industry standard material specifications which will provide better guidance to manufacturers' on what tests need to be conducted and how they should be conducted.

When ABAA first started, the process was very subjective and it did not take long to realize that the process needed to change. ABAA realized that the process had to be built on the performance of the material and prescriptive requirements had to be removed (e.g. minimum thickness requirements). ABAA developed a table of material properties which listed the test method to determine the material property and what was the performance level that was required.

In 2018, ABAA constituted a Task Group to develop a listing of the potential material categories and most common types of air barriers. This approach has allowed the industry to form a better distinction between one category and another. The document provides guidance to a manufacturer to determine where their material best fits. The base of categories then allows for an industry material specification to be developed for each category/type. This document will evolve over time as material specifications are developed and as new materials come on the market.

The material specification includes additional details on water resistance requirements for materials that can be both an air barrier material and a water resistive barrier material.

The first industry material specification to be developed was the ABAA 0003 Light density open cell semi-rigid spray polyurethane foam – Material specification.

The Light density open cell semi-rigid spray polyurethane foam material specification now gives guidance and details as to what is required to be listed as an ABAA Evaluated Material. As this is specific to the material, it also requires an ABAA Master Project Specification which provides details as to how to make the material an air barrier assembly and eventually an air barrier system. The limitation of the Light density open cell semi-rigid spray polyurethane foam is that it cannot be exposed to the weather – it needs to be installed on the interior between framing members. As such, to make the Light density open cell semi-rigid spray polyurethane foam into an air barrier assembly, air barrier accessories need to be used to seal all the air leakage paths not covered by the material.

ABAA will be transitioning all current material property tables into industry material specifications. All new categories/types will be developed under the new format.

The other industry material specification that has been developed is ABAA XXXX Standard Material Specification for Air and Water Resistive Barrier Material – Medium Density Closed Cell Rigid Spray Polyurethane Foam.

Materials currently being developed by the Technical Committee are:

- ABAA XXXX Standard Material Specification for Air Barrier Material – Building Wrap –– Sandwiched –– Engineered Polymer Film
- ABAA XXXX Standard Material Specification for Air Barrier Material – Non-insulating sheathing –– Gypsum based.
- ABAA XXXX Standard Material Specification for Air and Water Resistive Barrier Material – Fluid Applied Coatings
- ABAA XXXX Standard Material Specification for Air and Water Resistive Barrier Material – Fluid Applied Membranes.

The goal is to transition all Tables for material requirements to industry material specifications by the end of the year.

For any manufacturer that brings a new material to be evaluated by ABAA, they will have to meet the material specification requirements as they are developed. The requirements are not retroactive and will not affect any material listing that currently exists.

# ABAA'S 8TH ANNUAL CONFERENCE MARCH 26-28, 2019

## THE 2019 CONFERENCE IN NORFOLK, VIRGINIA PROVED TO BE YET ANOTHER GREAT SHOW FOR ABAA!

Attendees took part in different aspects of the conference that were offered including the trade show, networking events, educational presentations, and training sessions for air barrier installers and third party auditors.

ABAA was fortunate to have a fantastic panel of speakers providing informative lectures and understanding of air barrier systems and their importance with the building envelope as a whole. This year we featured our keynote speaker Dr. John Straube presenting Why Air Barrier Specialists Need to Understand Water.

For the first time at the ABAA conference, the board of directors held a "meet the board" event at a local brewery. It was a nice opportunity to unwind and network between the ABAA board, it's members and all that attended the conference. We will be doing the same type of event next year in Reston and everyone is welcome to attend!

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america
CONFERENCE
& TRADESHOW


## INSTALLER EDUCATION AND TRAINING

Training courses for installers were offered to increase the knowledge of proper air barrier application and in order to qualify for certification. Courses were offered for self-adhered membranes, fluid applied membranes and sprayed polyurethane foam. The hand's on aspect of the training was made available by our local members assisting in donating labor, materials, equipment and the building of mock-up's. We want to express our appreciation to Ocean Drywall in allowing us to use their facility and building the mock-up's. Equipment for spray foam was generously provided by Joe Hogge of the Drying Company.

## SPECIAL THANKS GO OUT TO OUR SPONSORS WHO MADE THIS EVENT POSSIBLE!

Master Wall Inc. 30 YEARS STRONG

OCEAN Drywall

TMI® AIR BARRIER TESTING

TREMCO® Commercial Sealants & Waterproofing

GIC® GENERAL INSULATION COMPANY, INC.

USG | TREMCO

SECUROCK® EXOAIR® 430

# *TRAINING & EDUCATION* UPCOMING EVENTS

AIR BARRIER EDUCATION FOR THE CONSTRUCTION INDUSTRY

## SYMPOSIUMS AND PRESENTATIONS

**BEC DETROIT ABAA SYMPOSIUM - DETROIT, MI**
May 8, 2019 https://aiadetroit.com/calendar/

**BEC - KANSAS CITY**
May 9, 2019 http://bec-kcmo.org/events/

**BEC RESEARCH TRIANGLE SYMPOSIUM - RALEIGH, NC**
May 23, 2019 https://bec-researchtriangle.org/

**SEABEC – SEATTLE, WA**
June 20, 2019 https://www.seabec.org/event-calendar

## UPCOMING INSTALLER TRAINING

**SELF-ADHERED & FLUID TRAINING**
June 4-6, 2019 in Charlotte, NC
http://www.airbarrier.org/education/installer-courses/
*Stay tuned for more details on additional Auditor and SPF Training

## COME VISIT US AT

**SEABEC SYMPOSIUM - SEATTLE, WA**
May 14, 2019 https://www.seabec.org/symposiums

**ATX BUILDING PERFORMANCE CONFERENCE - AUSTIN, TX**
May 17, 2019 https://www.aiaaustin.org/event/2019-atx-building-performance-conference

**AIA CONFERENCE ON ARCHITECTURE - LAS VEGAS, NV**
June 6-8, 2019 - BOOTH 6147 https://conferenceonarchitecture.com

**CONSTRUCT SHOW - BALTIMORE, MD**
October 9-11, 2019 - BOOTH 331 www.constructshow.com/en/home

**GO TO WWW.AIRBARRIER.ORG TO REGISTER FOR ANY UPCOMING INSTALLER TRAINING OR CONTRACTOR WEBINARS; SEE THE EVENTS TAB.**

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**We would love to hear your feedback on our newsletters and any content you want to see more or less of, contact us at abaa@airbarrier.org and let us know!**