

Exhibit

Comments received by the Department between January 2017 and February 2019 from stakeholders sharing their opinions on updating the statewide energy conservation code.



February 28, 2017

Dear Governor Carney:

The undersigned organizations represent manufacturers and installation contractors of building insulation. Our products save the residents of your state money on utility bills, lower the environmental impact of buildings, and create well-paying jobs in the manufacturing and construction sectors. In fact, the insulation industry is part of an energy efficient economy that provides over 2 million jobs in the United States.

We write to ask that your state adopt and enforce updated building energy codes, requiring new buildings and substantial retrofits to comply with cost-effective energy efficiency requirements. Model building codes are developed through a consensus-based process that allows equal stakeholder participation. This process occurs on a three-year cycle to ensure that code provisions reflect current industry knowledge and technology. All changes to the model building codes are voted on by governmental representatives from local, state, and federal jurisdictions. Ultimately, each state decides how and when to update their building codes.

Nationwide, commercial and residential buildings account for 40% of total energy use and 75% of total electricity use. The U.S. Department of Energy estimates that building energy codes will return \$126 billion in energy cost savings from 2010 to 2040. In avoiding emissions, building energy codes will save the equivalent of emissions from 245 coal power plants over the same period. Building energy codes do more than just save energy. Mortgage default risks are 32% lower in energy-efficient homes.

Importantly, recent natural disasters remind us that we must build today with the challenges of tomorrow in mind. Energy efficiency is an integral component of resiliency and energy codes ensure that our built environment survive after the storms pass.

The men and women in your state represented by our collective organizations stand ready to support your efforts to strengthen your state's building energy efficiency policies.

Sincerely,

ACC Center for the Polyurethanes Industry Spray Foam Coalition
Cellulose Insulation Manufacturers Association
Insulation Contractors Association of America
National Insulation Association
North American Insulation Manufacturers Association
Extruded Polystyrene Foam Association
Spray Polyurethane Foam Alliance
Structural Insulated Panel Association
Polyisocyanurate Insulation Manufacturers Association



DE 2018 IECC Adoption 1NOV18

November 1, 2018

Patricia Murray
The Department of Natural Resources and Environmental Control (DNREC)
Division of Climate, Coastal & Energy
100 W. Water Street Suite 5A Dover, DE 19904
302-735-3480

RE: The State of Delaware's Adoption of 2018 IECC

Dear Ms. Murray,

Thank you for the opportunity to participate in the Delaware code adoption process. Northeast Energy Efficiency Partnerships (NEEP) respectfully submits comments, as per the October 18, 2018 request for comments, for your review and consideration.

We appreciate that the Delaware Codes Coalition has chosen to consider adoption of the 2018 IECC, the current model energy code. The adoption of the 2018 IECC will assure maximum energy and cost savings for building owners and operators, and provide overall carbon reduction statewide. Additionally, the 2018 IECC will be simpler for state and local code officials to administer as the code clarifies various administrative inconsistencies of past versions.

The narrowing of the previously proposed amendments to the remaining three is advantageous. However, we have concerns regarding the weakening of the code presented in the current amendments still under consideration.

Delaware Proposed Amendments

Amendments 1 and 2 are of lesser concern than **Amendment 3**. However, allowing building cavities for returns and supply is an outdated construction practice. The 2018 IECC specifically restricts the use of cavity spaces as ducts. Building cavities used as return-air plenums is a leading cause of duct leakage in homes today. Air leakage from ductwork may use more energy, increase utility bills, lower occupant comfort, and make the HVAC system less efficient. **Amendment 2** is considered effective building practice with potential savings exceeding the very minimal cost to implement. **Amendments 3**, is the most problematic and would result in the biggest loss of energy efficiency.

Amendment 3 would not only weaken the 2018 IECC but would also represent a rollback of Delaware's current requirements. If Delaware hopes to achieve improved efficiency and potential net-zero goals, at a minimum, the 2018 code should not be weaker than the current code. **Amendment 3** does two things that create difficulties:



First, it would increase costs for homeowners by allowing envelope air leakage to be as high as five ACH50, with no requirement to “make up” for these energy losses elsewhere in the building. The amendment(s) would allow more air leakage in Delaware’s updated code than the current code allows. It is our understanding that Delaware’s 2012 code requires three ACH50, but allows four ACH50 for homes 1,500-2000 sq.ft. or five ACH50 for homes with < 1,500 sq. ft. While we recognize that smaller homes have a greater challenge achieving three ACH50, we do not believe the solution is to weaken the efficiency for all homes in the state.

Second, **Amendment 3** would create a conflict in the code by allowing higher air leakage rates (and less efficiency) in the simulated performance path and Energy Rating Index (ERI) while requiring the IECC-level air leakage rate (three ACH50) in the prescriptive path. Although the compliance options are not identical in terms of overall efficiency, many of the baseline requirements are the same for all three paths (including air leakage). Having two different air leakage baselines for the three compliance options could create compliance and enforcement problems.

Potential Compromise Proposal

It is our strong recommendation that Delaware adopts the 2018 IECC unamended (see below). However, if the Division of Climate, Coastal & Energy were interested in a compromise amendment regarding whole house air changes, we suggest the language below:

Potential Compromise Proposal for Delaware 2018 IECC

R402.4 Air leakage (Mandatory). The *building thermal envelope* shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.5.

R402.4.1 Building thermal envelope. The *building thermal envelope* shall comply with Sections R402.4.1.1 and ~~R402.4.1.2~~ through R402.4.1.3. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

R402.4.1.1 Installation (Mandatory). The components of the *building thermal envelope* as indicated in Table R402.4.1.1 shall be installed in accordance with the manufacturer’s instructions and the criteria indicated in Table R402.4.1.1, as applicable to the method of construction. Where required by the *code official*, an *approved* third party shall inspect all components and verify compliance.

R402.4.1.2 Testing (Mandatory). The *building* or dwelling unit shall be tested for air leakage and verified as having an air leakage rate not exceeding five air changes per hour in *Climate Zones 1 and 2*, and three air changes per hour in *Climate Zones 3 through 8*. The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by



an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

R402.4.1.3 Leakage Rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 3.0 air changes per hour when tested in accordance with Section R402.4.1.2.

Weakening Amendments

NEEP believes that a straightforward adoption of the 2018 IECC with **no weakening amendments** is paramount to ensure that homeowners receive the energy and cost-saving benefits of the latest model energy code. The 2018 IECC is the final product of a well-developed, long-standing model code development process that involves the nation's leading experts in energy efficiency, building design and product performance professionals, state and local governmental officials, product manufacturers, architects, and builders. Building codes are developed to be adopted and complied with as published. Amending the code - particularly with weakening code provisions - has detrimental consequences. Weakening the code makes the code less cost-effective to implement, disrupts potential valuation savings, causes confusion in the real estate market and among design professionals, and reduces the code's overall power to act as a driver toward further energy efficiency, carbon reduction, and market transformation.

Getting To Zero

One issue that has fallen by the wayside over the past several months is addressing the state mandate to get to zero energy buildings by 2025. Time to take action on the mandate is moving quickly as 2025 will be only two more code cycles from the 2019 adoption of the 2018 IECC. NEEP recommends that the



DE 2018 IECC Adoption 1NOV18

Division consider a few options that would be within your regulatory purview for accelerating codes and construction to move toward zero energy. The first is adopting alternative compliance paths to code

compliance. Several states, including Massachusetts, allow homes built to Passive House Standards as an alternative to the base energy code provisions. U.S. DOE Zero Energy Ready Homes (ZERH) could also be used as an alternative compliance path to the base energy code; the DOE ZERH program is allowed in Rhode Island as an alternative compliance path. Both Passive House and ZERH are programs eligible for additional points under Delaware's Qualified Allocation Plan (QAP) for Low Income Housing Tax Credits, so there is already state precedent.

The second is adopting voluntary stretch codes to encourage zero energy construction within the state. We would recommend the adoption the U.S. DOE Zero Energy Ready Homes Program for residential construction and the ICC/ASHRAE Standard 189.1 for commercial buildings. Six states (MA, MD, NH, VT, NY, and DC) in the NEEP region currently utilize various stretch codes. NEEP can provide additional information on the codes, standards, and programs named above as well as technical assistance on how to implement them within Delaware.

In Conclusion

Energy efficient high-performance homes will provide numerous health, safety, and cost benefits to Delaware residents for the life cycle of the building. NEEP is available to offer on-going technical assistance as the Division considers adoption and amendments to the 2018 IECC. We are available to discuss the comments above with the Division and the Code Coalition. Please feel free to share our comments. If you have any questions or need additional information, please don't hesitate to call.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Port'.

Darren Port
NEEP - Northeast Energy Efficiency Partnerships
81 Hartwell Avenue, Lexington, MA 02421-3137
781-860-9177 Ext.132
dport@neep.org
www.neep.org

Northeast Energy Efficiency Partnerships (NEEP) is a regional non-profit organization whose mission is to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

NEEP's Buildings and Community Solutions Team supports the region to increase building energy efficiency by providing technical resources and assistance to states to develop, implement, and comply with building energy codes among other energy initiatives

Murray, Patricia E. (DNREC)

From: Reid Rowlands <reid@worldclasssupply.com>
Sent: Thursday, November 01, 2018 10:42 PM
To: Murray, Patricia E. (DNREC)
Subject: Re: Codes comment reminder

Patty,

While I have been unable to attend the Codes Coalition meetings in Dover these past months due to timing during the day and my work schedule, I have been following the minutes and comments. I wanted to respond specifically to the amendment that is being proposed to the adoption of the 2018 IECC with regards to R402.4.1.2. It is my understanding that the codes coalition is putting forth an amendment that effectively weakens our code that is currently in place. There is documented building science regarding the physics of air movement and amount of air exchange through a building envelope. As we decrease the air exchange of a building, we decrease the risk of mold in the walls, decrease the discomfort to its occupants and decrease the use of energy to heat and cool our buildings. Conversely, if we weaken the existing code by increasing the ACH limit we would increase these issues. Based on my understanding of the comments made during the meetings, the reason for wanting to weaken our existing code was that someone advised that it's too difficult to achieve 3 ACH 50. I consult on many Certified Passive House projects where the requirement is point 6 ACH and while that extreme air tightness can be difficult, reaching 3 ACH 50 is not. I will agree that it does take training of the work force to appreciate the need for air sealing during normal construction, but it is not that difficult to achieve. Besides being a Certified Passive House Consultant, I serve on the City of Newark Design Review Committee and deal with many student rental developers who have to deal with the realities of costs and time constraints within their projects. I spoke with one of the larger developers today and asked him specifically about the difficulties of achieving the code requirement of 3 ACH and was told they have no problem with meeting it. I would hope that the State of Delaware would want to be a leader in sustainable construction and climate mitigation instead of weakening our existing code. I would recommend adopting the 2018 IECC code as written given it has already been reviewed and vetted by a much larger community of interested expert parties who have taken these issues into consideration.

I would also like to quote (not verbatim) Sam Raskin from the DOE, who once told me that if all you do is build to code then great, you pass and you get your CO.- You have now achieved a passing grade - which is a D. We should strive as a state and as builders do better than that.

Thank you for considering my comments.

Best regards,

Reid

Reid Rowlands - CPHB | CPHT | CPHC®

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.com

High Performance Design & Supply Center

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302-737-1441 - reid@worldclasssupply.com



Patricia Murray
Delaware Department of Natural Resources and Environmental Control
Division of Climate, Coastal & Energy
100 W. Water Street Suite 5A Dover, DE 19904

November 1, 2018

RE: Brief RECA Comment on Codes Coalition Consideration of 2018 IECC and Recommendation Regarding Proposed Amendment 3

Dear Ms. Murray,

The Responsible Energy Codes Alliance¹ appreciates the opportunity to comment on Delaware's proposed adoption of the 2018 *IECC* for residential and commercial construction. We believe that a straightforward adoption of the 2018 *IECC* with no weakening amendments is the most ideal way to ensure that building owners and occupants will receive all the energy and cost-saving benefits of the nation's latest model energy codes. The energy and cost savings of the *IECC* for residential and commercial buildings are well-documented², and the adoption of these codes will help keep Delaware on track with its energy efficiency goals.

Our understanding is that one of the potential amendments that the Codes Coalition is reviewing – Proposed Amendment 3 – could impact the required level of air tightness of the building thermal envelope and could represent a step backward in efficiency as compared to the current code in Delaware. **We strongly encourage the Codes Coalition to (1) adopt requirements that are no less efficient than the current code; (2) reject Proposed Amendment 3; and (3) if a compromise on envelope air tightness is needed, adopt language (outlined below) that is narrowly drawn to allow for additional flexibility without sacrificing efficiency.**

¹ RECA is a broad coalition of product and equipment manufacturers, trade associations, building science experts, and energy efficiency advocates that promote the adoption of the latest model energy codes in every state. A list of our members can be found on our website, www.reca-codes.com.

² See, e.g., U.S. Dep't of Energy, *Cost-Effectiveness Analysis of the Residential Provisions of the 2015 IECC for Delaware* (Feb. 2016); U.S. Dep't of Energy, *Determination Regarding Energy Efficiency Improvements in the 2015 International Energy Conservation Code (IECC)*, 80 Fed. Reg. 33250 (Jun. 11, 2015); U.S. Dep't of Energy, *Cost-Effectiveness Analysis of ASHRAE Standard 90.1-2013 for the State of Delaware* (Dec. 2015); U.S. Dep't of Energy, *Final Determination Regarding Energy Efficiency Improvements in ANSI/ASHRAE/IES Standard 90.1-2016: Energy Standard for Buildings, Except Low-Rise Residential Buildings*, 83 Fed. Reg. 8463; and U.S. Department of Energy, *Energy and Energy Cost Savings Analysis of the 2015 IECC for Commercial Buildings* (Aug. 2015).

1. The code update should not include any provisions weaker than current code.

We believe that if Delaware hopes to achieve improved efficiency and potential net-zero building goals, then at a minimum, the 2018 code should not be weaker than the current code. Proposed Amendment 3 does two things that could frustrate these goals:

First, it would increase costs for homeowners by allowing envelope air leakage to be as high as 5 ACH50, with no requirement to “make up” for these energy losses elsewhere in the building. This would allow more air leakage in Delaware’s updated code than the current code allows. (Our understanding is that Delaware’s 2012 code requires 3 ACH50, but allows 4 ACH50 for homes 1,500-2000 sq.ft. or 5 ACH50 for homes with < 1,500 sq. ft.) While we recognize that smaller homes sometimes have more of a challenge achieving 3 ACH50, we do not believe the solution is to weaken the efficiency for all homes in Delaware.

Second, Proposed Amendment 3 would create a conflict in the code by allowing higher air leakage rates (and less efficiency) in the simulated performance alternative and Energy Rating Index, while requiring the *IECC*-level air leakage rate (3 ACH50) in the prescriptive path. Although the *IECC*'s compliance options are not identical in terms of overall efficiency, the mandatory requirements are the same for all three paths (including air tightness and testing requirements). Having two different air tightness baselines for the three compliance options would create compliance and enforcement problems.

2. The most straightforward, most efficient option is to adopt the 2018 *IECC* envelope air tightness requirements.

Our preference would be for Delaware to adopt the full 2018 *IECC* requirements for air tightness and testing, which would maintain a mandatory maximum tested air leakage level at 3 ACH50. We believe that the 2018 *IECC*'s air tightness testing requirement will save homeowners money, keep occupants more comfortable, and improve the home’s resilience over time. This requirement has been part of the 2012, 2015, and 2018 editions of the *IECC*, and several states that have adopted these codes have maintained the air tightness requirement at these levels. As a result of improved air tightness requirements in codes, homebuilders have adapted building practices and learned techniques that have made homes tighter and more efficient, and we do not expect these innovations or trends to end in the years ahead. A 3 ACH50 envelope air tightness requirement is both reasonable and achievable.

3. If Delaware seeks additional flexibility on envelope air tightness, any trade-offs should remain as energy-neutral as possible.

If the Codes Coalition determines that an amendment is necessary in order to provide additional flexibility for homebuilders, we recommend maintaining the code baseline at 3

ACH50 for all compliance options, while allowing energy-equivalent trade-offs up to 5 ACH50. This will reduce the risk that a home will be built with excessive air leakage, and it will help account for potential efficiency losses.

We understand that two additional changes have been proposed to Proposed Amendment 3 in recent days, but neither of these changes addresses the loss of energy savings that would result from increasing the code baseline for air leakage from 3 ACH50 to 5 ACH50. A better approach, which we provide below, would be to set a maximum, “mandatory” air leakage cap for all compliance paths at 5 ACH50. The “prescriptive” baseline would remain at 3 ACH50, as would the baseline for the simulated performance path (R405). This would allow builders to demonstrate that the home achieves (at most) 5 ACH50, as long as the efficiency losses are accounted for through other improvements elsewhere in the home (such as improved insulation, fenestration, or other measures).

In this regard, we suggest the following language changes to the 2018 IECC:

R402.4 Air leakage (Mandatory). The *building thermal envelope* shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.5.

R402.4.1 Building thermal envelope. The *building thermal envelope* shall comply with Sections R402.4.1.1 and ~~R402.4.1.2~~ through R402.4.1.3. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

R402.4.1.1 Installation (Mandatory). The components of the *building thermal envelope* as indicated in Table R402.4.1.1 shall be installed in accordance with the manufacturer’s instructions and the criteria indicated in Table R402.4.1.1, as applicable to the method of construction. Where required by the *code official*, an *approved* third party shall inspect all components and verify compliance.

R402.4.1.2 Testing (Mandatory). The *building* or dwelling unit shall be tested ~~for air leakage and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8.~~ The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

R402.4.1.3 Leakage Rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 3.0 air changes per hour when tested in accordance with Section R402.4.1.2.

Conclusion

Overall, we firmly support Delaware moving toward adoption of the 2018 *IECC*, and we believe that the positive impacts of these actions will benefit owners and occupants of residential and commercial buildings for generations. We appreciate the opportunity to comment on the Codes Coalition's proposed amendments, and we offer our assistance and experience in energy code adoption and implementation as you work to maximize building energy efficiency. Please contact me at (202) 339-6366 if you have any questions or would like to discuss how RECA can be of assistance.

Sincerely,

Eric Lacey
RECA Chairman

RECA is a broad coalition of energy efficiency professionals, regional organizations, product and equipment manufacturers, trade associations, and environmental organizations with expertise in the adoption, implementation and enforcement of building energy codes nationwide. RECA is dedicated to improving the energy efficiency of homes throughout the U.S. through greater use of energy efficient practices and building products. It is administered by the Alliance to Save Energy, a non-profit coalition of business, government, environmental and consumer leaders that supports energy efficiency as a cost-effective energy resource under existing market conditions and advocates energy-efficiency policies that minimize costs to society and individual consumers. Below is a list of RECA Members that endorse these comments.

Air Barrier Association of America

Alliance to Save Energy

American Chemistry Council

American Council for an Energy-Efficient Economy

CertainTeed Corporation

EPS Industry Alliance

Extruded Polystyrene Foam Association

Guardian Industries Corporation

Institute for Market Transformation

Johns Manville Corporation

Knauf Insulation

National Fenestration Rating Council

Natural Resources Defense Council

North American Insulation Manufacturers Association

Polyisocyanurate Insulation Manufacturers Association



November 2, 2018

Patricia Murray
The Department of Natural Resources and Environmental Control (DNREC)
Division of Climate, Coastal & Energy
100 W. Water Street Suite 5A Dover, De 19904
Delivered Via Email To: Patricia.Murray@state.de.us

Dear Ms. Murray:

Thank you for the opportunity to provide comments regarding the Division's review of the 2018 International Energy Conservation Code (IECC) for residential and commercial construction. The American Chemistry Council (ACC) and its members support the Division's adoption of the 2018 IECC without weakening amendments.

ACC is an Important Stakeholder

ACC represents more than 170 leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. The business of chemistry is a \$768 billion enterprise and a key element of the nation's economy. Chemistry companies are among the largest investors in research and development, investing \$91 billion in 2016.

The decisions of the Division of Climate, Coastal, and Energy impact ACC's members and their employees. The chemical industry supplies many products and materials to the building and construction value chain, including those that deliver energy efficiency throughout the entire structure. ACC's members are also large users of energy so the responsible use of energy is important to the industry's economic health and competitiveness. Energy efficiency is the lowest cost option for meeting energy demand. Energy efficient buildings create economic opportunities for businesses and industry by promoting new energy efficient technologies and reducing energy waste.

ACC has extensive knowledge regarding building code development. ACC is a partner in recent building science research, including projects with the Department of Energy and Home Innovation Research Labs. ACC representatives serve on the ICC, ASHRAE, ASTM, AAMA, and other code and standard setting bodies.

ACC Supports the 2018 IECC without Weakening Amendments

The chemical industry supports the adoption of the 2018 IECC as the Delaware State Energy Code. Although we understand that some adaptations specific to Delaware may be necessary, we caution against weakening the substantive requirements for energy efficiency.

Amendments that weaken the energy conservation provisions of the IECC are not necessary given the inherent flexibility of the code. The 2018 IECC provides flexibility with numerous compliance paths including an Energy Rating Index path, a performance path, and a prescriptive path that provides alternative approaches of minimum R-value requirements, maximum assembly U-factor requirements and an area weighted U-factor method. A builder can benefit from this flexibility to find their lowest-cost path to achieving code compliance. These options are internally balanced; a weakening amendment to one path could create a loophole in the energy code. An amendment that results in paths of varying efficiency



defeats the purpose of a minimum standard and may deceive citizens and residents about the energy, air quality, moisture control, and general performance of their homes.

The 2018 IECC Is Affordable

Proponents of rolling back the energy code may wrongly suggest that an update to the 2018 IECC will drive up construction costs. As manufacturers, we know a strong energy code with the flexibility of many equally strong compliance paths will unleash the power of competition without picking winners or losers. For example, the proposed R-values and U-factor requirements are constructible with various products and combinations of products. In contrast, state-specific amendments to the energy code can increase legal, contracting, design, and materials transaction costs.

For homebuyers who must maintain the home and pay for its utility and operational costs, features that reduce maintenance and utility bills are critically important. Reduced energy bills quickly repay the cost of improving energy efficiency.

Many Technical Resources Are Available to Help

The 2018 IECC provides guidance for practical matters, such as cladding attachments to support constructability and compliance. In addition, manufacturers provide installation instructions for use of their products. Various third-party resources are available to support code compliance with helpful practices for construction. For example, ACC's Foam Sheathing Committee supports the technical information for builders on www.continuousinsulation.org, and ACC's Spray Foam Coalition has excellent resources at <https://polyurethane.americanchemistry.com/polyurethanes/Spray-Foam-Coalition/>.

Available resources provide a variety of actionable and code-compliant solutions to optimize moisture control, integrate various wall functions and components, and equip builders/designers with conventional or more advanced options for resilient, energy efficient performance. Thus, as with many forms of construction (including conventional framing, advanced wood framing, SIPs panels, ICF forms, etc.) there are significant resources available to support not just one but many reasonable options.

Thank you for the opportunity to offer our comments. For any questions, please do not hesitate to contact me at (202) 249-6223 or via email at Josh.Young@americanchemistry.com. ACC, its member companies and our employees thank you in advance for considering our views.

Sincerely,

Josh Young
Senior Director, Government Affairs
State Affairs and Political Mobilization
American Chemistry Council



November 2, 2018

Patty Murray
Division of Climate, Coastal & Energy
100 W. Water Street Suite 5A
Dover, DE 19904

GREEN
BUILDING
UNITED

Dear Ms. Murray:

Thank you for the opportunity to submit comments to support Delaware's code adoption process on behalf of Green Building United. The State of Delaware has an opportunity to be a leader in the region by considering the 2018 International Energy Conservation Code (IECC) for adoption and we welcome the opportunity to participate in the process.

The proposed air leakage amendment jeopardizes Delaware's leadership in adopting modern, energy efficient codes. It is a step backward from what is required by the current 2012 IECC and runs counter to Delaware's zero net energy capable homes by 2025 goal. It has the potential to cause confusion in enforcement and may be costly to consumers if their homes have more envelope air leakage.

Before addressing the remaining proposed amendments on a line-by-line basis, **we would like to express our strong support for submitting the entire, unamended 2018 International Codes for public comment.** We also feel that it is incumbent upon those seeking amendments to demonstrate broad support for the changes and to justify the impacts of the proposed alternatives.

The International Codes are developed and voted on through an open and transparent consensus process by members from government and a diverse group of industry professionals to ensure that the outcome reflects the best technology, materials, and practices that the market can bear. They are widely used throughout the United States, helping provide consistency for the architects, engineers, and contractors that work across jurisdictions. There must be data-driven and widespread support for any amendments given the thorough consensus process that determines what is included in model codes.

In addition, given that the proposed changes would decrease residential energy efficiency, those proposing the amendments need to provide significant justification for the impact that will be passed along to homebuyers in the form of higher utility bills and decreased comfort.

Comments on the Proposed Amendments

→ Amendment 1

Proposed Exception

R403.3.5 Building cavities (Mandatory) *Building framing cavities shall not be used as ducts or plenums.*

Exception: Returns run exclusively through conditioned space and not located on exterior walls, floors or ceiling assemblies

Using building cavities for air returns increases duct leakage. Green Building United's concern with this proposed exception is not as strong as other proposed amendments but discourages any practice that has the strong potential to increase utility costs and lower occupant comfort.

→ Amendment 2

R 403.5.3 Hot Water Pipe Insulation (Prescriptive)

1. Piping larger than ¾ inch (19.1 mm) ~~and larger~~ in nominal diameter.

~~#4 Piping from the water heater to a distribution manifold.~~

Hot water pipe insulation is an inexpensive practice. Green Building United does not support its removal, as its cost is quickly recovered by the avoided heat loss.

→ Amendment 3 – two proposals

#1 Proposed Change to Amendment 3

R402.4.1.2 Testing. (Mandatory) *The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Where using section R405 SIMULATED PERFORMANCE ALTERNATIVE or Section R406 ENERGY RATING INDEX COMPLIANCE ALTERNATIVE, five air changes per hour shall be permitted in Climate Zones 3 through 8. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.*

This proposed amendment as written does not seem to address the concerns expressed by the sole objector in the October 18 meeting. This amendment does not address prescriptive path requirements and instead brings in language pertaining to the simulated performance and ERI compliance paths that exists unamended in different sections of the code. We discourage use of this amended language simply on the basis that it creates confusion for both compliance and enforcement.

#2 Proposed change to Amendment 3

R402.4.1.2 Testing (Mandatory). *The building or dwelling unit shall be tested for air leakage and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.*

This proposed amendment is of most concern to Green Building United. Requiring that a project only meet five air changes per hour is a step backward from what is required by the current 2012 IECC and runs counter to Delaware's zero net energy capable homes by 2025 goal. The proposed changes can also be costly to consumers whose homes can have more envelope air leakage and thus require more energy use to maintain comfort levels.

While the 2012 IECC in Delaware currently allows homes under 1,500 square feet to meet a five air changes per hour requirement, we do not agree with extending this allowance to all homes when the intent is to improve performance over current code. If, ultimately, there is a desire to maintain tiered requirements for homes above and below 1,500 square feet, using the requirements of the 2018 IECC as a guide, those requirements should shift to four air changes for homes below 1,500 square feet and three air changes per hours for homes 1,500 square feet or more.

Conclusion

Delaware has an exciting opportunity to lead the region in modern energy code adoption with the adoption on the 2018 IECC, reducing the impact of the built environment and improving the quality, asset value, and performance of buildings for prospective buyers.

The public should have the opportunity to review and comment on an unamended version of the 2018 IECC this November. To amend before opening to the public would misrepresent the potential cost and energy savings associated with adopting the 2018 IECC in pursuit of the state's zero net energy capable homes by 2025 goal. From a process perspective, it is important that what the public is presented reflects the majority opinion of the stakeholder meetings and written comments.

We appreciate your consideration of our comments and welcome any additional questions.

Thank you,

Katie Bartolotta
Policy and Programs Director
Green Building United

Green Building United is an independent 501(c)(3) nonprofit organization. Our mission is to foster transformative impact in our communities through green building education and advocacy, and our vision is a sustainable, healthy, and resilient built environment for all. Our region includes the greater Philadelphia area, Lehigh Valley, and the State of Delaware. Our community is made up of architects, engineers, policy makers and advocates, landscape architects, marketing and communications professionals, developers, contractors, building managers, building operators, government workers, and more. Green Building United's stakeholders share a common interest in green building and sustainability, and knowledge levels range from novice to expert.



International Code Council
Central Regional Office
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Country Club Hills, IL 60478
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November 20, 2018

Dear Patricia,

The International Code Council commends the state of Delaware for considering adoption of the 2018 International Energy Conservation Code (IECC), one of 15 modern, coordinated and correlated building codes that make up the International Codes (I-Codes).

The Code Council is here to support your jurisdictions in application of the energy code. We offer no-cost technical assistance to members and support materials for phased implementation of the IECC. We also offer a robust infrastructure to support the administration of the code that includes training and education, certification for enforcement personnel, and a full suite of support publications – both print and electronic.

To date, the energy code has saved U.S. consumers over \$44 billion and avoided 36 million tons of carbon dioxide emissions. Between 2010 and 2040, the U.S. Department of Energy expects that model building energy codes will save homeowners and businesses up to \$126 billion in energy costs. In June 2018, the United States Conference of Mayors unanimously adopted a resolution in support of the IECC as a cost-effective strategy to lower energy waste in the buildings sector and reduce greenhouse gas emissions.

Beyond energy savings, the IECC plays a critical role in promoting safer and more resilient buildings. The IECC's building envelop provisions help control for condensation that could otherwise turn to rot, which destroys the building structure, and mold and mildew, which harm human health. Its air management requirements protect occupants from external hazards, like garage car exhaust and radon, and ensure adequate ventilation of indoor emissions from certain building materials, finishes, paints and cleaning products. In addition, the IECC's requirements for tight construction and air sealing help prevent the spread of fire and smoke. The IECC also helps maintain livable temperatures for longer in cases of extreme weather, allowing occupants to "shelter in place." A study after Superstorm Sandy – which left 8 million people without power – showed that new energy codes can allow residents to stay in their homes for more days during blackouts triggered by heat waves or cold freezes.

Technology, methodology and best practices change. The I-Codes are updated every three years to incorporate those improvements. Updating to the 2018 I-Codes will ensure that the citizens of Delaware are protected by the latest and most technologically advanced construction provisions. Importantly, updates to the codes are not always about adding new provisions, but also are about eliminating and replacing outdated provisions with safer, more cost-effective and more efficient ways of building.

Please do not hesitate to reach out with questions or to discuss how the Code Council can support Delaware in application of the IECC.

A handwritten signature in blue ink that reads "Michelle Britt".

Michelle Britt, LEED AP
Director, Energy Programs
International Code Council
Direct: 708-816-9607
mbritt@iccsafe.org

cc: Sara Yerkes, Senior Vice President, Government Relations

109 E. Division Street
Dover, DE 19901
Telephone: 302-678-1520



W. Mark Gandy

President

Verity Watson

Executive Vice President

SERVING DELAWARE SINCE 1947

January 23, 2019

Patricia Murray

The Department of Natural Resources and Environmental Control
Division of Climate, Coastal and Energy
100 W. Water Street Suite 5A
Dover, DE 19904

Dear Ms. Murray,

On behalf of the Home Builders Association of Delaware, I'd like to express our disappointment over the decision to move forward with the 2018 IECC without any of our proposed amendments.

As you know, of all the members of the energy code coalition, we feel our organization is the largest stakeholder. Not only do we represent our interests from building and selling homes, but also the interests of potential buyers and affordability.

The affordability issue is one we have always raised, and you have probably heard over the years. We understand that the energy code coalition focuses on one item; energy conservation. The members of the coalition feel that increasing efficiency and the associated costs are money well spent. However, what they don't see, that our organization does is that there are other groups, all with their own good intentions and associated regulations, and resulting costs. Stormwater management, Sewage regulations, fire sprinklers, building codes, land use codes, etc. are all "issues" that we are constantly dealing with that increase the cost of housing. HBADE is the only one who looks at the total picture and raises the red flag when needed.

While we understand that energy efficient homes are important, there is also the factor of “diminishing returns”. The easy fruit, so to speak of energy increases that provide the most efficiency for the costs have been taken with previous codes. As a result, this new code and future ones provide less energy gain for each dollar spent.

What is troubling, as has been reported by the individuals who have been attending the code meetings on our behalf, is that there has been no discussion of cost of this new code and what the payback period would be in energy saving for that additional cost. It sounds like the attitude is to adopt the code regardless of the cost. I find it concerning that the State is adding regulations without knowing the cost to their constituents’.

While it easy to minimize the actual cost increase, affordability is a big factor. With mortgage rates creeping up, some buyers are being knocked out of the market to buy a new home. Our industry is seeing buyers walk away from contracts of sale on a new home because they could no longer afford the increase in the mortgage payment from the higher rate. My point is that even a small increase can be dismissed as not much, or acceptable, but to others, that small increase means not buying a new home at all.

Less buyers affects that State of Delaware as well, as the transfer tax will be reduced.

We feel that the three amendments requested are very reasonable. They were negotiated over an 18-month period when adopting the 2012 code. We dispute that they greatly weaken the code.

Below are the three amendments and the detailed reasoning for them:

Amendment 1:

R403.2.2 amend to add:

Supply duct tightness shall be verified by either of the following:

1. Post-construction test: Total leakage less than or equal to 6 cfm (169.9/min) per square feet (9.29 m²) of conditioned floor area when tested at the pressure differential of 0.1 inches w.g. (25 Pa)
2. Rough-in test: Total leakage less than or equal to 6 cfm (169.9/min) per square feet (9.29 m²) of conditioned floor area when tested at the pressure differential of 0.1 inches w.g. (25 Pa) (remainder unchanged - If the air handler is not installed s 4 cfm ...)
3. Certified duct and envelope tightness (DET) verifier.
 1. Testing for duct and building envelope tightness shall be conducted by a certified DET verifier.

R403.3.5 Building cavities (Mandatory) Building framing cavities shall not be used as ducts or plenums. Exception: Returns run exclusively through conditioned space and not located on exterior walls, floors or ceiling assemblies

Amendment 2:

R403.4.2: amend list to:

1. Piping larger than 3/4 inch nominal diameter.
2. Piping serving more than one dwelling unit.
3. Piping located outside the conditioned space.
4. ~~4 Piping from the water heater to a distribution manifold.~~
5. Piping located under a floor slab.
6. Buried piping.
7. Supply and return piping in recirculation systems Delete Table R403.4.2 without substitution.

DELETE TABLE R403.4.2 MAXIMUM RUN LENGTH

Amendment 3:

4.1.3 R402.4.1.2:

Exception: A building or dwelling unit with 2,000 ft² or less of conditioned floor area (CFA) may satisfy R402.4.1.2 if it:

(1) is tested to have an air leakage rate no greater than:

1. 5 ACH-50 for homes with < 1,500 ft² of CFA, or
2. 4 ACH-50 for homes with 1,500- 2,000 ft² of CFA.)

NO CHANGE but added exception

4.1.4 R403.2.3 Building framing cavities shall not be used as ducts or plenums.

Exception: Returns run exclusively through conditioned space.

Detailed reasoning behind the desired amendments

- The Amendments:
 - Amendment 1
 - When adopted under the 2012 code this amendment moved the threshold from 4% to 6% of SqFt allowed in a Duct test - the standard until that point was visual inspection but if a test was done it was 12%. The math considered here becomes problematic with regards to smaller homes - Habitat for Humanity and the

like. Small SqFt presents a small target to get to while larger houses enjoy a larger target.

- An exception was added in with this amendment allowing for panned returns as long as they were fully contained within conditioned space. Panned returns are otherwise written out of the 2018 IECC, which we believe is an unnecessary step and increased cost.
- This amendment was accepted by the ECC members with no arguments against it.

o Amendment 2

- This amendment eliminates Hot Water Pipe Insulation in unnecessary conditions. Studies have shown that pipes located within conditioned space do not benefit from pipe insulation because the heat is not retained at such a level that the occupant will use the water which had sat in the pipe. After only a few minutes, the occupant will run the water to clear the line to again have hot water straight from the water heater. NAHB has good numbers on this practice, showing that pipe insulation has no impact on the hot water use of occupants.
- Two changes to this amendment were proposed:
 - Trivial wording "larger than" appearing before "3/4 inch" instead of "and larger" appearing after "3/4 inch." ---No consequences at all.
 - The elimination of "#4 Piping from the water heater to a distribution manifold" as it was found by the ECC that manifold systems either exist in conditioned space or in a wall which is packed out with insulation (making the requirement unnecessary).

o Amendment 3

- This amendment gave us our tiered system for Blower Door compliance (**see below**). Air Changes per Hour under 50 Pascals of pressure - ACH50, is a terrible way to measure building leakage. The volume of the home becomes the denominator in this calculation, thus, the larger the home, the higher the ceilings, if you can pay for a basement or conditioned crawl, the easier it is to pass this test. A house with 6000 SqFt need not have air sealing to pass this test, so large is the volume while a house which is small, slab on grade will not pass this test. Requiring houses to pass this Blower Door requirement discourages small, stacked stories, slab on grade; discourages builders from building Low Income Housing. The change was not to weaken the code but to set a more level playing field for small and large homes.
 - A 1200 SqFt Slab on grade house with 8' ceilings would have to meet a threshold of 480 Cubic Feet per Minute at 50 Pascals (CFM50) while the same house with 9' ceilings on a 9' basement

(virtually NO extra room for leakage) would have to meet a threshold of 1140 CFM50 (which is 2.375 times higher a threshold with no added leakage area).

- $ACH50 = (\text{Measured CFM50} * 60) / (\text{Volume of the House})$

Thank you for your consideration in this matter.



Frederick T. Fortunato

Life Director

Home Builders Association of Delaware