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Infiltration rates

Additional submitted attachment is included below.

2022-NR-ENV2-F Nonresidential Envelope - Reduced Infiltration

The numbers used to determine air infiltration rates are extremely conservative on one hand and overly optimistic on the other.

a. **no continuous air barrier - 1.1 cfm/ft^2 @ 75 Pa** - the reports I have seen have an average of 1.5 – 2 cfm/ft^2 @ 75 Pa with buildings not built with an air barrier.

b. **Continuous air barrier only, not verified - 0.7 cfm/ft2 @75 Pa** - it is impossible to conclude that simply installing an air barrier would reduce the air leakage by over 50%. You cannot see air leakage and putting an air barrier material over a gypsum board substrate which already meets the requirements for an air barrier does not reduce the air leakage of the whole building. It is attention to details (making it continuous) that will impact the results. Past research projects have shown that buildings constructed by the same contractor using the same floor plane had wide test results even when they were built on the same street. My person experience has shown me that the builder that brags how tight their buildings are built, but has never tested them, their buildings turn out to the leakiest. If you are not looking carefully at the details, you miss all the leaks.

c. **Air barrier + field inspection – 0.5 cfm/ft^2 @ 75 Pa** – It has been shown that the installer will do a better job when they know their work is being inspected. The field inspection will go a long way to improving the airtightness, but you cannot see air leaks so without site testing using options available in ASTM E1186 *Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems*, you are still at the point where there could be air leakages that are not visible. However, it is a major improvement over no air barriers or continuous air barrier only, not verified.

d. **Air barrier + testing – 0.4 cfm/ft^2 @ 75 Pa** – This is the only way to know what the air leakage of the building is. The maximum leakage rate of 0.4 cfm/ft^2 @ 75 which can increase to 0.6 cfm/ft^2 @ 75, is a very low bar for the industry to achieve. Many areas are instituting 0.3 cfm/ft^2 @ 75 and the Army Corps of Engineers have shown that with training and some experience, that the 0.25 cfm/ft^2 @ 75 can be met quite easily and buildings are now coming in as low as 0.03 cfm/ft^2 @ 75.

Installation of air barriers – not verified and field inspection

There is a major improvement in the airtightness of buildings when the installer knows an inspection will be conducted. I suggest that the air barrier only, not verified - is overly optimistic and without testing you will never know. The increase in air tightness levels with an inspection will be a significant improvement over not verified and, in many cases, will be more than 30% to 40%.

Trained and Qualified Professionals

There are many qualified professionals who can conduct the inspections and the testing required to expand the use in additional climate zones. The question of their qualifications can be answered by a show of their experience. The Air Barrier Association of America (ABAA) ABAA has conducted air barrier inspections across the United States, including California, and in many other countries for almost 20 years. ABAA has delivered training programs for installers for all different types of air barriers for the same period.

ABAA is developing a training program for Blower Door Technicians that focus on the ASTM E3158. *Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building* but includes

the requirements for all other whole building test methods. This document started out with ABAA updating the USACE protocol for conducting whole building testing and when that was finished the work carrier on the develop a ABAA test method. That document was proposed as a ASTM document which was published as a ASTM test method in 2018.

At the same time, ABAA is developing a certification for Blower Door Technicians that will be used to confirm that the person has the knowledge, skills, and abilities to conduct the test. The certification program is administered under the ISO 17024 *Conformity assessment — General requirements for bodies operating certification of persons* standard and this allows an easy means for anyone to know that the person has the qualifications to conduct the test.

The inspection reports generated by the ABAA inspector is used to continue the training of the installers by pointing out deficiencies and at the same time, providing guidance on how to correct the deficiency. This allows the leak to be fixed but also provides them with the training to not make the same mistake.

In 2021 ABAA will have a training program for a Air Leakage Diagnostician (people who find the leaks) which will be an update to the current training the ABAA inspectors receive. Their certification will be updated to confirm that the person has the knowledge, skills, and abilities to perform the visual inspection. The certification program is administered under the ISO 17024 *Conformity assessment — General requirements for bodies operating certification of persons* standard and this allows an easy means for anyone to know that the person has the qualifications to perform a visual inspection.

Several other organizations are adding to the pool of people who have the qualifications required for conducting blower door tests and performing visual inspections of air barriers.