BUILDER INFORMATION

This project will provide builders with procedures to easily integrate the aerosol sealing technique into standard construction practices and reduce the cost of less effective conventional sealing. The team will work with two Minnesota and two California builders to conduct aerosol sealing of at least 26 houses and will determine how to produce more consistent sealing performance and improved air tightness in an economic manner.

BENEFITS

Work directly with manufacturer and air sealing experts to determine how this new technology can reduce sealing costs and produce more reliable results. You will receive:

- Thorough assessment of 9 to 14 houses on the quality of sealing typical envelope leaks and recommendations for replacing current sealing methods with aerosol sealing.
- A comprehensive written report for each house.
- Cost estimates for current sealing methods compared to the aerosol approach.
- No cost aerosol sealing of 5 to 8 houses.
- Blower door test of 7 to 12 houses to confirm that they meet code tightness requirements.

BUILDER INVOLVEMENT

This project requires active participation to help the project team determine how to best apply this new technology. Participants will:

- Observe initial demonstration of aerosol sealing process.
- Meet with project staff to review results of the demonstration and leakage assessments to establish approaches for (a) the point at which aerosol sealing is applied during the construction process and (b) what current sealing will be eliminated for the test houses.
- Provide access to house plans and construction details for assessment of sealing details.
- Provide access to a specified number of houses to be assessed and sealed.
- Assist with evaluation of labor and material costs for your current sealing methods (this may include allowing project staff to observe subcontractor work and having subcontractors document labor time and material costs).

TIMELINE AND PROCESS

The project will follow a seven step process, conducted over about a year for the first builder. The initial house assessments, demonstration aerosol sealing, and meeting to identify sealing options will be completed in the first two months. Over the next four months at least five houses will be sealed and two other “control” houses will be assessed and tested. As much as possible, the sealing work will be concentrated over two or three periods. The second builder will start their process about halfway through the first builders work, following a condensed process lasting only six months and sealing only one set of houses. Both builders will finish around the same time.

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WORK SCHEDULE

First Builder		Project Months											
Step	**Work Description**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	Test/assess 2-3 houses	■											
2	1 house sealing demo	■											
3	Meeting to identify 2 sealing options		♦										
4	Aerosol sealing of 5 houses			■	■	■	■						
5	Meeting to revise sealing approach							♦					
6	Aerosol sealing of 2 houses									■	■	■	■
7	Project wrap-up meeting												♦

Second Builder		Project Months											
Step	**Work Description**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	Test/assess 2-3 houses							■					
2	1 house sealing demo							■					
3	Meeting to identify sealing option								♦				
4	Aerosol sealing of 2 houses									■	■	■	■
5	Project wrap-up meeting												♦

WHY THIS RESEARCH IS NEEDED

In many parts of the U.S. building envelopes are notoriously leaky with unintended flows between conditioned and unconditioned spaces that result in additional space heating and cooling. While voluntary codes and standards for envelope tightness have existed for decades, only recently have these codes become a requirement. Current state-of-the-art envelope air sealing methods are manual with often variable results that are impacted by the time allotted and the vigilance and experience of individual contractors. In addition, it is common for air-tightness verification to be performed by a different contractor after the sealing when most or all of the construction is complete. This provides limited opportunity for feedback on air sealing effectiveness, causing difficult and expensive remedial sealing at later stages of construction.

The aerosol sealing technology developed by the Western Cooling Efficiency Center (WCEC) at UC Davis is an automated method that is capable of meeting and exceeding high-performance standards for building envelopes. The process involves pressurizing the building while applying an aerosol sealant “fog” to the building interior. As air escapes the building through leaks in the envelope, the sealant particles are carried to the leaks where they impact and stick, sealing the leaks. The system displays real-time feedback and a permanent record of the sealing. Thus, the technology is capable of simultaneously measuring, locating, and sealing leaks, significantly improving quality control and reducing labor costs.

This project will provide significant research needed to successfully integrate aerosol envelope sealing into standard home construction practices and reduce the cost compared to less-effective, conventional sealing methods. Previous field research has shown that the aerosol technology is capable of a more consistent sealing performance and improved air tightness in an economic manner, reducing energy use from heating and preventing moisture issues within the building. Aerosol sealing also has the potential to reduce both labor and material costs for conventional sealing as well as contractor training and quality control, thus alleviating concerns regarding the availability of properly trained laborers.

MN Contact: Ed VonThoma
Building Knowledge
612-867-3228
edvt@buildingknowledge.com

CA Contact: Curtis Harrington
UC Davis WCEC
530-754-7670
csharrington@ucdavis.edu

cee
Center for Energy and Environment