

CASE STUDY: COMPARING THE AIR-SEALING BENEFIT OF ECOSEAL PLUS™ AND SPRAY FOAM IN EXTERIOR WALLS



"We were able to achieve significantly better blower door test results when we used ECOSEAL on our homes."

—S. Craig Morrison, Cimarron Capital, Inc.

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PROJECT

Cimarron Homes,
Durham, North Carolina

PRODUCTS USED

- ECOSEAL Plus™
Water-Based Elastomeric Sealant
- EcoBatt® insulation

CHALLENGE

More restrictive building codes require reliable solutions for air sealing. States moving to the 2012 International Energy Conservation Code (IECC) will hold builders accountable for meeting these requirements with a mandatory blower door test.

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SOLUTION

Knauf Insulation developed ECOSEAL Plus™ water-based elastomeric sealant to help contractors consistently deliver quality air sealing results. Some builders use spray foam in exterior walls to help meet blower door code requirements. However, spray foam may not be the most cost effective or highest performing solution this challenge. ECOSEAL Plus is a fast-drying, water-based elastomeric spray that seals penetrations and joints in the building envelope. It dries to a tough film that remains flexible over a wide range of temperatures. The sealant penetrates gaps as large as 3/8" and as small as 1/8", and it coats the face of smaller gaps, sealing joints. ECOSEAL Plus is environmentally-friendly and does not require mixing hazardous chemicals on the job site or generate hazardous off-gasses while it cures. ECOSEAL Plus is low-emitting so it meets or exceeds all state and federal VOC requirements for architectural sealants, and is certified formaldehyde-free.

Testing
 ECOSEAL air sealant has been laboratory tested in accordance with ASTM E2357 for use in creating air barrier assemblies. However, to test its efficacy in the field, a test was designed to compare ECOSEAL Plus's performance to open cell spray foam. Working with Cimarron Homes in Durham, North Carolina, 16 planned new construction homes were chosen and split into two groups of eight. Every attempt was made to hold as many variables constant as possible so that the results were a representative 'apples to apples' comparison. To that end, every home was built utilizing the same:

- Architectural plan
- Sub-contractors
- HVAC, windows, and other components
- HERS rater/Energy Star verification
- Vented attic (R-38 blowing wool)

The only variable that changed was the exterior wall air sealing and insulation strategy. Eight homes were air sealed with ECOSEAL Plus and insulated with EcoBatt® insulation. The eight remaining homes were insulated with fully filled and trimmed open cell spray foam following industry best practices. All sixteen homes were inspected by a third party HERS rater and built to Energy Star V2 standards.

Following completion of the homes, blower door testing was scheduled per standard routine. The results were as follows:

ECOSEAL Plus + EcoBatt		Spray Foam	
House	Blower Door (CFM)	House	Blower Door (CFM)
1	651	9	849
2	736	10	883
3	799	11	809
4	751	12	678
5	850	13	675
6	763	14	940
7	770	15	689
8	680	16	680
Average	750	Average	775
Std. Dev.	59	Std. Dev.	101
Range	199	Range	265

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RESULT

The results indicate that there is very little difference in air sealing performance between the two systems. Not only is the average air leakage of the ECOSEAL Plus sealed homes slightly lower, but the range and standard deviation are smaller, indicating more consistency in the installation of ECOSEAL Plus.

Conclusions

As building energy codes continue to progress, there is more emphasis on performance. There is also confusion about what strategies and materials are necessary to meet the new requirements.

ECOSEAL Plus is the latest innovation that contractors can use to proactively help builders meet these growing needs. On the job site, crew members appreciated the ease of application and the quick cleanup, which requires only water instead of chemical solvents.

Chad Copley, Project Manager with Cimarron Homes, stated that "the seal at the top of the sheetrock seemed to be much more effective...for the bottom plate area, coverage was better than with foam sill seal and regular caulk, and the municipal and third party (energy star) inspections were easier because there was no daylight or penetrations at all."

ECOSEAL Plus is an effective air sealing product that saves time, helps keep the project on schedule and provides the thermal barrier necessary for energy efficiency requirements without harmful effects. ECOSEAL Plus also contributes to LEED certification in categories such as building energy performance, using sustainable building materials and promoting better indoor air quality.

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