

International Energy Conservation Code



Residential Air Barriers
Air Infiltration and Insulation

What we will learn

1. The side affects of non-encapsulated insulation
 1. Reduction in R-value
 2. Reduction of wall efficiency
2. The importance of air barriers



What does the code require?

- Section 402.4 Air Leakage
 - The building thermal envelope shall be durably sealed . . .
 - Includes knee walls
 - Utility penetrations and others



Reduction of R-Values

- R-value is the measure of resistance to heat flow
- Rated R-values are stated as maximum potential
- Statements that R-values can be discounted or enhance due to air infiltration are misleading
- R-value and “air infiltration” are two distinct issues that must be addressed separately by the builder



Bonus Room Knee Walls

1. 5 sided encasement
 2. High rate of air infiltration
 3. 30% or more reduction in efficiency
 4. Should be considered and entered properly when using trade-off option
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Montana Case Study on Air Sealing

Is air sealing a home a large incremental cost?

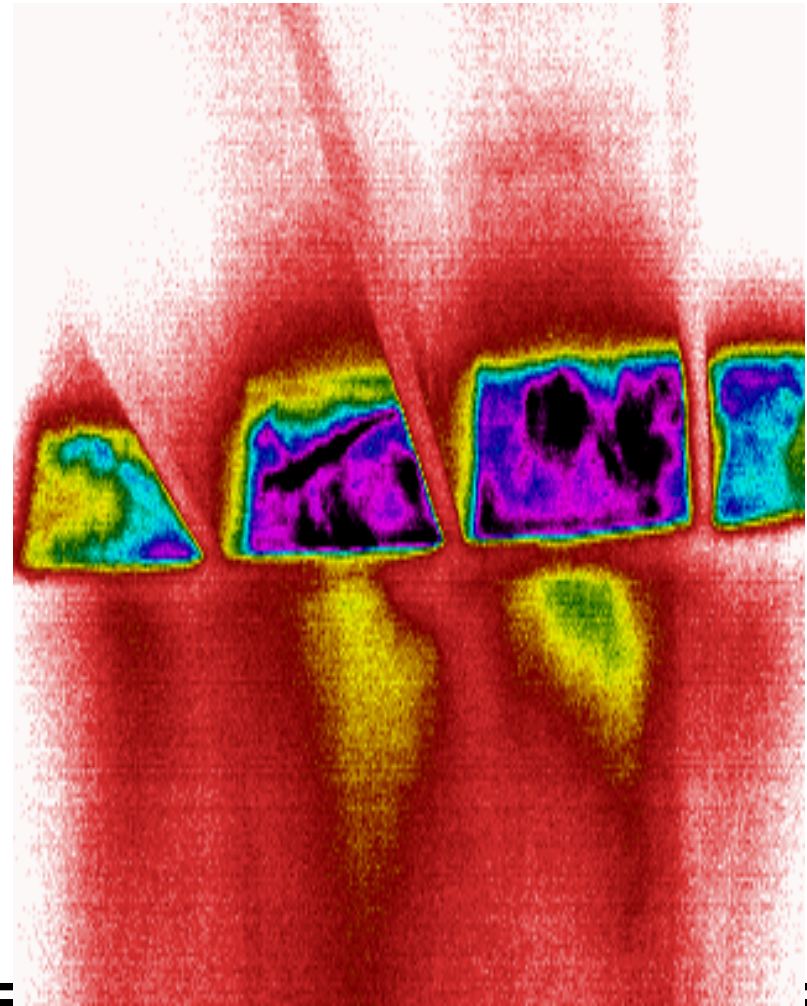
Problems occurring by not air sealing can be expensive – in this case \$30,000



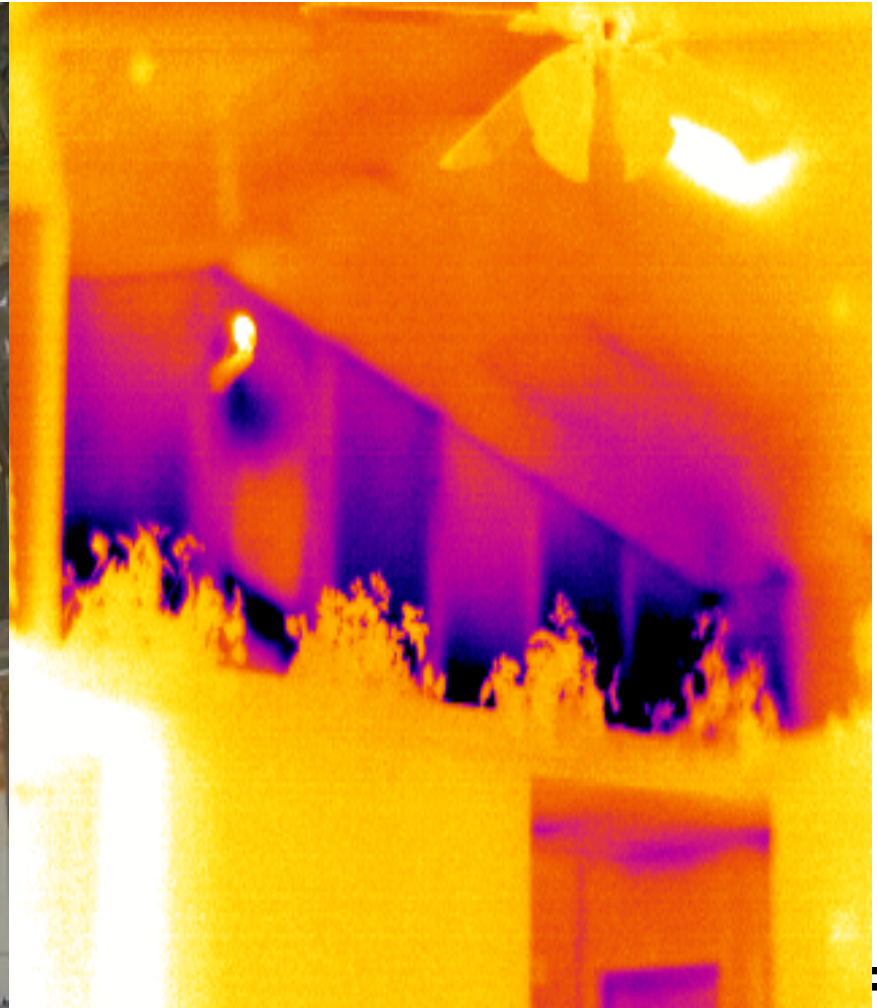
Montana Case Study on Air Sealing



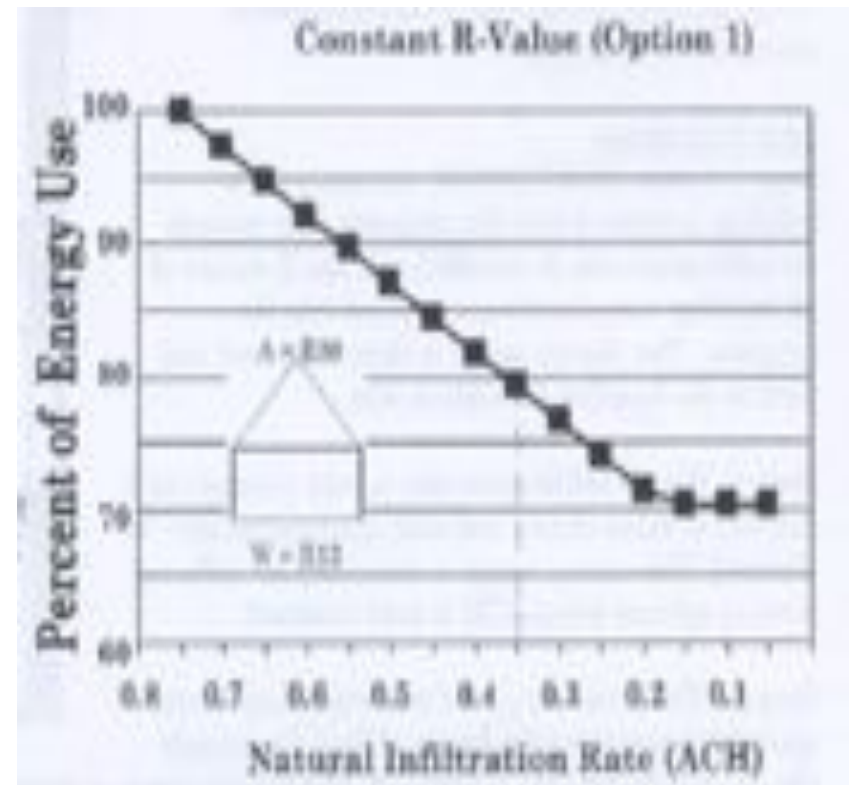
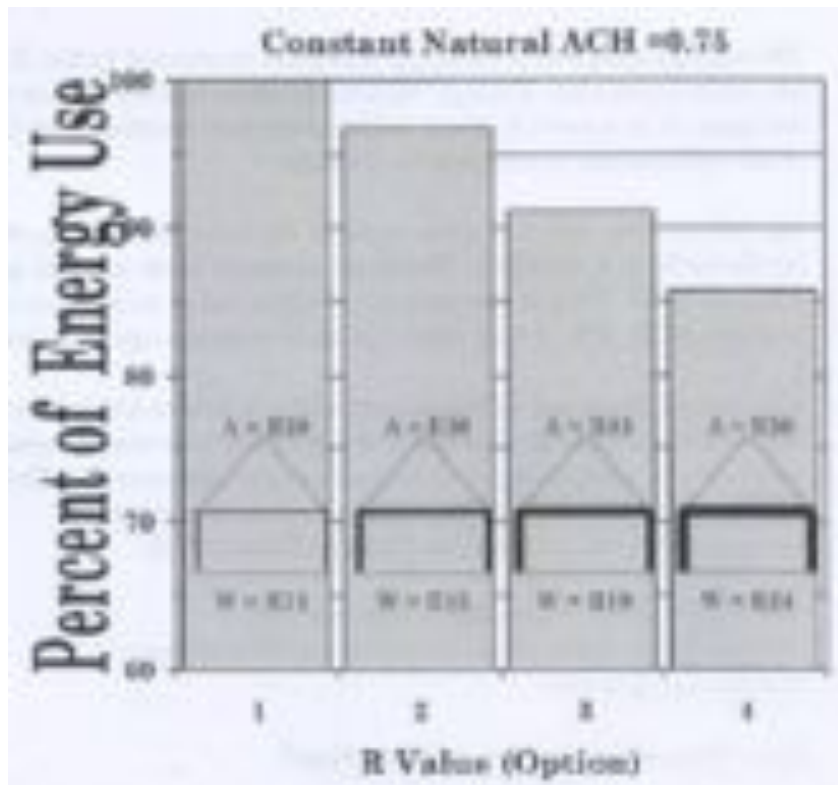
Montana Case Study on Air Sealing Rim Joist Air Leakage



Montana Casestudy on Air Sealing Knee Wall



Example



Seal It Insulation Systems – R-Value vs. Insulation

Results

1. Best results using a constant ACH with increase of insulation gained 15%
 2. Best results use constant R-values and decreasing ACH gained 30%
 3. Shows that air-sealing is twice as effective as increasing insulation alone
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Considerations

- ASHRAE recommends a mechanical ventilation rate of .35 ACH to maintain indoor air quality
 - *Want to know what cfm you need for .35 ACH?*
 - $.35 \text{ (ach)} \times \text{house volume}/60 = \text{CFM}$
 - Negative indoor pressures and natural draft appliances
 - Make-up air?
 - Whole house ventilation system
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