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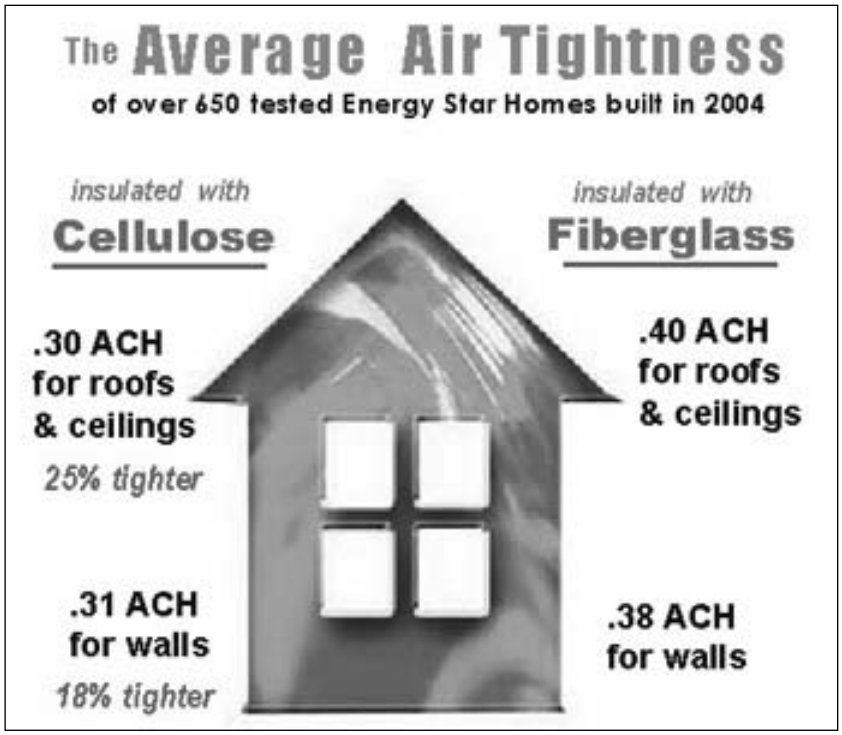
Thermal Performance
Air Tightness

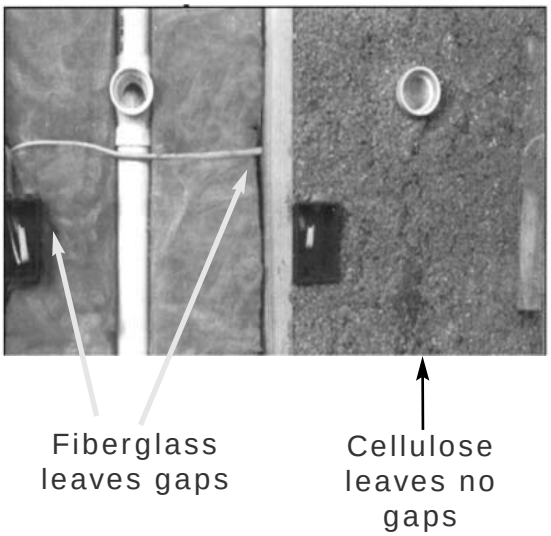
Thermal performance of structures depends upon many factors. Some of these factors are total R-value of all system components, air infiltration due to leakage through gaps in the system, air infiltration due to permeability of system materials, convective flow within insulated systems, thermal bridging across the building envelope, and the thermal mass of building components.

For years the debate has been that cellulose insulated houses have less air leakage than those insulated with fiberglass batts. The Colorado Study in 1990, brought this topic to the forefront, however, the study left many questions unanswered. Until recently, no large scale correlation between air tightness and insulation material had been conducted.

As reported in *Energy Design Update* in 2005, Bruce Harley, technical director for residential energy services for the Conservation Services Group in Westborough, Massachusetts, assembled air tightness data on Energy Star single-family and multi-family homes completed during 2004 in Massachusetts and Rhode Island. Data was divided by wall insulation type or ceiling insulation type. There was no easy way to segregate the houses with more than one type of insulation from those with a single type of insulation. Prior to construction, it was not known this type of analysis would be done, therefore it is reasonable to assume they would represent typical construction methods and techniques to achieve an Energy Star rating.



Seamless Seal of Cellulose



Houses insulated with cellulose were significantly tighter than those insulated with fiberglass. The data showed consistent correlation between insulation type and air tightness, however, the reasons for the correlation are unknown. Is it possible that

(1) cellulose contractors are more meticulous in performing air sealing tasks?
(2) builders' attention to air sealing is a factor ?
(3) the differences in air tightness are due to differences in the material characteristics between fiberglass and cellulose?

You decide. This is one factor in the overall thermal performance of structures. Be a smart consumer.