

## **Equivalent or System R-Value Claims Being Marketed in Nebraska May Not Meet the R-value Requirements of the Nebraska Energy Code**

The Nebraska Energy Code (Code) requires that the construction of all new buildings, additions and substantial building remodels meet the minimum requirements of the 2003 International Energy Conservation Code (IECC). The IECC establishes minimum efficiency requirements for the “energy using” systems within a building such as mechanical system efficiencies, water heating system controls, lighting wattage limitations and ductwork sealant and insulation requirements. It also requires buildings to have a minimum level of insulation throughout the building envelope (e.g. ceilings, walls, floors, basement walls, crawlspace walls, etc.) or any part of the building that separates conditioned space from unconditioned space. The building envelope R-value requirements vary depending on how the building is used, where it is located and the type of construction materials being used.

Not surprisingly, in Nebraska the required R-values increase in the areas of the state that experience colder weather! The recent update of the Code, increases in energy costs and more energy conscious home buyers have challenged the members of the state’s construction industry to re-evaluate their past construction practices and energy efficiency strategies.

Unfortunately, these new energy concerns sometimes result in marketing strategies for insulating products that include enhanced R-values, often referred to as Equivalent or System R-Values, and quite often these enhanced R-value claims conflict with the verification and enforcement requirements of the IECC.

Two insulation products, manufactured by two separate manufacturers, are currently

using marketing strategies with Nebraska's builders, building material suppliers and building owners that are creating just such a conflict.

## Foil-Faced Polystyrene Insulation

The first product is a foil-faced polystyrene insulation whose marketers are making claims of an R-Value of 27 or 28 per inch. Their System R-value claim involves crediting their insulation product with the additional insulative values of the other products used in the construction of the wall, ceiling or floor "system" such as gypsum board, sheathing, siding, weather barriers and "dead air space." It also gives substantial R-value credit for the product's reflective properties. Product advertising states that the product "reflects up to 97% of radiant heat."

Distributors and marketers of a foil-faced polystyrene insulation product, met with Nebraska Energy Office staff regarding the marketing of their product within the state, and what product R-values would be acceptable in showing compliance with the R-value requirements of the IECC. It was determined that acceptable R-value claims for the P2000 residential insulation applications are:

- 3/8" EPS (expanded polystyrene) foil faced board = R-1.45
- 5/8" EPS (expanded polystyrene) foil faced board = R-2.42
- 1" EPS (expanded polystyrene) foil faced board = R-3.87

The determination, and future determinations for similar products, is based on the requirements of Federal Regulation 16 CFR 460 "The R-value Rule" and Section 102.5.1 of the IECC.

**Section 460.5 (d) of the Federal Regulation 16 CFR 460 "R-value Rule" states:**

For insulation materials with foil facings, you must test the R-value

## Spray Foam Insulation

The second product is a spray foam insulation product that markets the concept that "the most important job of insulation should be to control air leakage." The manufacturer's advertising discusses Equivalent R-values and promotes the idea that insulation should be able to control airflow and condensation and should not be evaluated solely on the R-value that the insulating product provides.

*The Energy Office analysis and determination of an acceptable R-value claim for these products are similar to the previous determination for foil-faced polystyrene insulation. The Federal Regulation 16 CFR 460 "The R-value Rule" and Section 102.5.1 of the IECC both still apply. Although tested R-values will vary, as a rule-of-thumb a typical low density, spray foam insulation should have an R-value of approximately 3.6 per inch and a typical high density, spray foam insulation should have an R-value of approximately 7 per inch. Enhanced R-value claims would need to be verified for local code jurisdictions with appropriate ASTM testing data.*

of the material alone (excluding any air spaces) under the methods listed earlier in the section. Or you can also determine the R-value of the material in conjunction with an air space by using one of two methods:

1. Test the system, with its air space, under ASTM C 236-89 (Reapproved 1993) or ASTM C 976-90, which are incorporated by reference in a previous paragraph of the section. If you do this, you must follow the rules in the paragraph on temperature, aging and settled density.
2. Add up the tested R-value of the material and the R-value of the air space. Determine the R-value for the air space based on previously stated rules.

*Although the p2000 marketing materials do provide reference to some ASTM tests being completed – **the completed tests are not the appropriate tests required under the R-values regulations of the Federal Trade Commission regulations.** Future product determinations of this or other foil-faced polystyrene insulation products will similarly require appropriate ASTM testing verification.*

**Section 102.5.1 of the IECC requires:**

“A thermal resistance (R) identification mark shall be applied by the manufacturer to each piece of building envelope insulation 12 inches or greater in width.

Alternatively, the insulation installer shall provide a signed and dated certification for the insulation installed in each element of the building envelope...”

*The section alternative is most commonly used for roof/ceiling blown-in insulation applications with code enforcement jurisdictions, including the Energy Office, accepting a signed and dated certification of*

*the systems thermal resistance (R) value from the installing insulation contractor.*

***Based on the lack of appropriate ASTM testing information, per the requirements of the “R-value Rule”, the Energy Office has determined that this is not an acceptable alternative to verify the R-value for this product.***