2007-2008 International Energy Conservation Code Proposals

Prepared by the
National Association of Home Builders

History

- **At the ICC public hearings in February, the Energy Efficient Codes Coalition submitted a package of 33 proposed changes to the ICC International Energy Conservation Code that it claimed would increase energy efficiencies in new homes by 30 percent.**
- **The proposals are collectively known as EC-14 or the “30% Solution.”**

History (cont'd)

- The EC 14 proposal failed. And when the 33 proposals were later submitted individually, only eight were approved, either as written or with some modification.

Re-submission of EC 14

- However, these proposals have been resubmitted and will be decided at the International Code Council Final Action Hearing in Minneapolis Sept 14-23. This time, a floor vote by all members will be required with a two-thirds majority necessary for passage.

Proprietary Interests

NAHB views EC14 and several of the individual proposals as serving proprietary interests, with changes not driven by energy conservation needs.

Would eliminate the use of cellulose and spray foam insulations for most applications.

Cost-effectiveness

- NAHB and it's members understand the importance of cost effectiveness and also how price increases – even for good reasons – are a serious disincentive for first-time home buyers and the construction of affordable housing stock.

History (cont'd)

- **In addition to EC-14, other individuals and groups have introduced proposals that would significantly affect housing affordability with little corresponding benefit**

- Acceptance of the proposals would certainly eliminate the cellulose and foam insulation markets from most applications.

EC 43

- The proposal allows some energy-efficient upgrades that trade-off on some more costly and/or difficult prescriptive requirements without the need to hire energy experts to calculate code compliance for every house as is already allowed in IECC Section 405. NAHB is in favor of this modification.

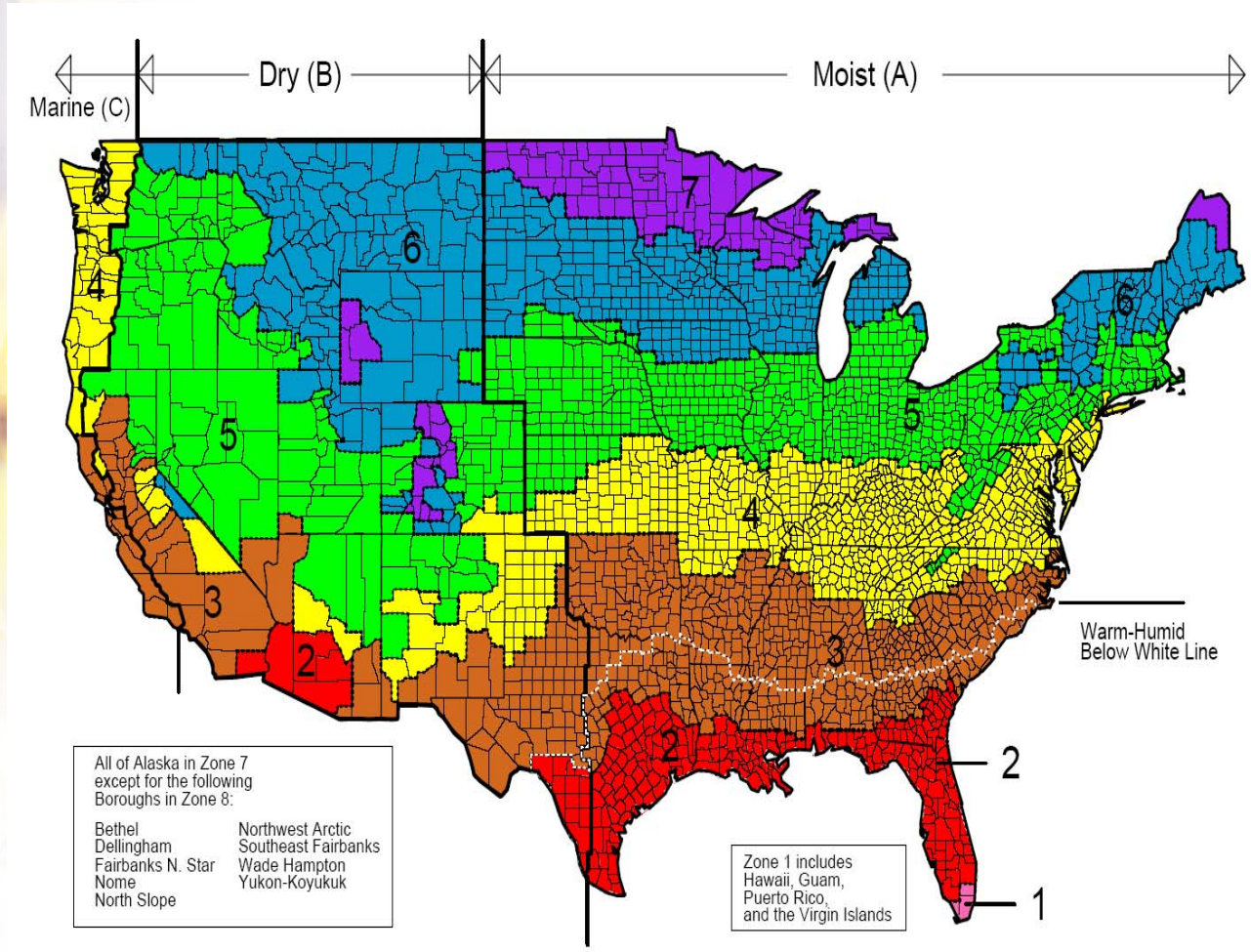
EC 71

- Require verification of duct sealing by pressurization test. This would require duct systems that are not fully inside the conditioned space be tested to ensure that air leakage is below a reasonable limit. Although the code already requires that ducts be sealed, its lack of verification requirements results in a continued problem of excessive duct leakage in new residences.

Structure of the ’06 IECC

- Chapter 1 Administrative & Enforcement
- Chapter 2 Definitions
- Chapter 3 Climate Zones
- Chapter 4 Residential Energy Efficiency
- Chapter 5 Commercial Energy Efficiency
- Chapter 6 Referenced Standards

Climate Zones – Chapter 3



Heating Degree Days

What are heating degree days and cooling degree days?

- Heating degree days are indicators of household energy consumption for space heating. It was found that for an average outdoor temperature of 65 degrees Fahrenheit, most buildings require heat to maintain a 70 degree temperature inside. Similarly, for an average outdoor temperature of 65 degrees or more, most buildings require air-conditioning to maintain a 70 degree temperature inside.

How heating and cooling degree days are computed…

- Take the high and low temperature for the day, and average them. If this number is greater than 65 F, then we have (Average temperature - 65) cooling degree days. If the average temperature is less than 65 degrees, then we have (65 - Average temperature) heating degree days. Running totals are kept for these units over a time period of a year so fuel distributors and power companies can assess average demands

Fenestration

- U-factor
  - Area weighted avg. of fenestration requirements shall be permitted to satisfy U-factor requirements.
- Solar Heat Gain Coefficient
  - Area weighted avg. of fenestration products >50% glazed shall be permitted to satisfy SHGC requirements.
- Glazed fenestration
  - Up to 15 sq. ft. is exempt from U-factor and SHGC requirements.
- Replacement fenestration shall meet requirements from Table 402.1

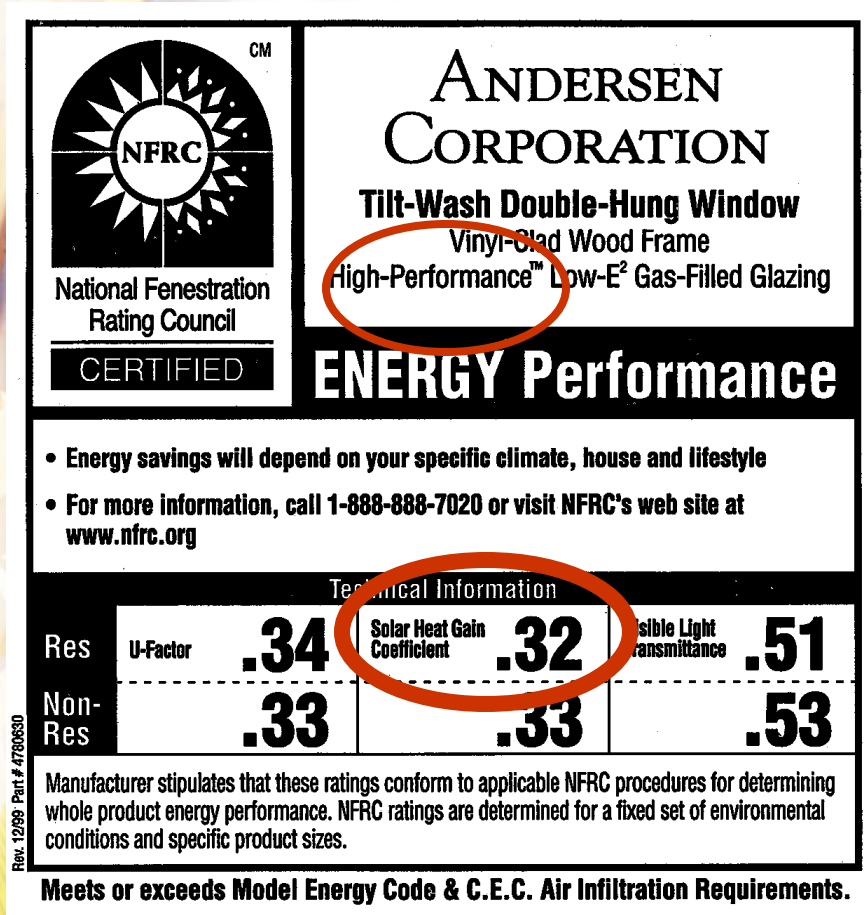
EC 16

- Lowers the fenestration U-factor in Zones 1-4
- From 1.20 to .65 in Zone 1.
- From .75 to .50 in Zone 2
- From .65 to .40 in Zone 3
- And from .40 to .35 in Zone 4

Key Elements

- This change will require going from a single to a double pane window in climate zone 1. Energy savings for a 2,000 square foot home going to a second pane would be about $8/year according to research conducted by National Assoc of Home Builders Research Center. The cost for changing 320 square feet of glazing to Insulated Glass (IG) glazing will approach $800 making the payback 100 years. This is well beyond anything that can be deemed cost effective.

Typical window sticker



NFRC CM

National Fenestration Rating Council

CERTIFIED

ANDERSEN CORPORATION

Tilt-Wash Double-Hung Window

Vinyl-Clad Wood Frame

High-Performance™ Low-E² Gas-Filled Glazing

ENERGY Performance

- **Energy savings will depend on your specific climate, house and lifestyle**
- **For more information, call 1-888-888-7020 or visit NFRC's web site at www.nfrc.org**

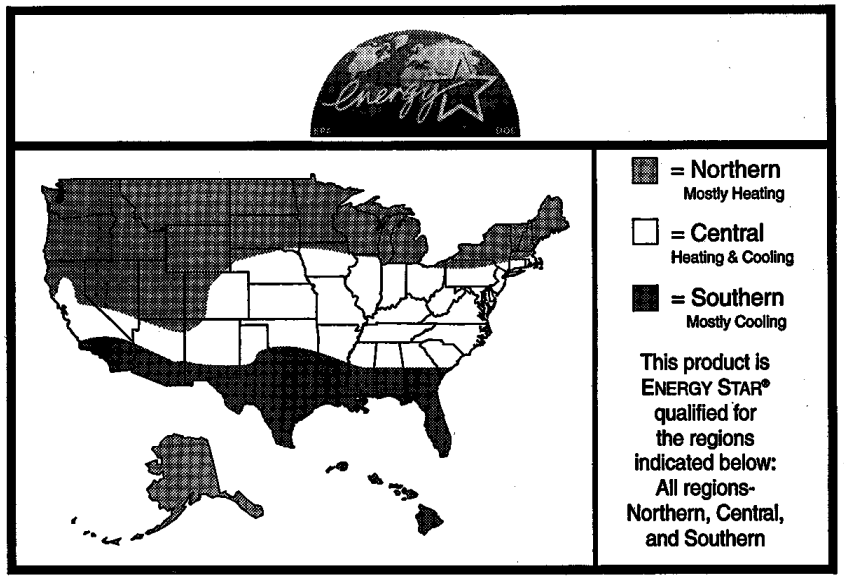
Technical Information

	U-Factor	Solar Heat Gain Coefficient	Visible Light Transmittance
Res	.34	.32	.51
Non-Res	.33	.33	.53

Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product energy performance. NFRC ratings are determined for a fixed set of environmental conditions and specific product sizes.

Rev. 12/99 Part # 4780630

Meets or exceeds Model Energy Code & C.E.C. Air Infiltration Requirements.



Tilt-Wash Double-Hung Window
Tested to NWWDA I.S. 2-87 Standard
DP 30

EC 26

Lower maximum SHGC in Zones 1-3

Availability of windows with SHGC values at or below 0.30 is limited;

- it is even more problematic for sliding glass doors.
- the visible light transmittance through most low SHGC windows is very low.
- There are some new solar heat gain limiting window coatings that allow more light to transmit through; however, there is a significant cost premium for them.
- This requirement also ties the hands of energy efficient designers.
- When designing a passive solar house to take advantage of winter solar heat gain on south facing windows in climate zones 2 and 3, a higher solar heat gain glass would be used.
- In order to meet the proposed 0.30 average SHGC requirement they would have to have glass with a SHGC considerably below 0.30 that is not commercially available.
- This proposal restricts energy efficient design options and has limited availability in the marketplace

EC 79 - Require electronic ignition for gas water heaters

- The 2-year payback and savings that the proponent reported are highly exaggerated.
- The pilot light is generally located below the water tank and is nearly as efficient as the gas burner in full operation essentially eliminating any energy savings.
- This proposed change will now require electricity to power an exhaust blower whereas the natural draft does not; the electricity usage was not taken into consideration in the cost justification.
- During prolonged outages, a piloted water heater will continue to work where an electronic ignition gas water heater will not.
- This is not an issue that the building codes should be addressing- this is an appliance issue.

EC 15 Require batt insulation that is compressed to be marked accordingly

- This is a problem where only the batt edges along the studs are compressed more than 1-inch.
- The heat loss is through the entire framed wall, not just the insulation.
- The proponent provided no data to show the increase in cost provides a cost-benefit.
- This proposal adds to the ineffective enforcement and inspection of an existing industry practice.
- By adopting this proposal, it effectively prohibits the use of unfaced batts that are currently permitted by the ICC.

EC 36 Basement Insulation

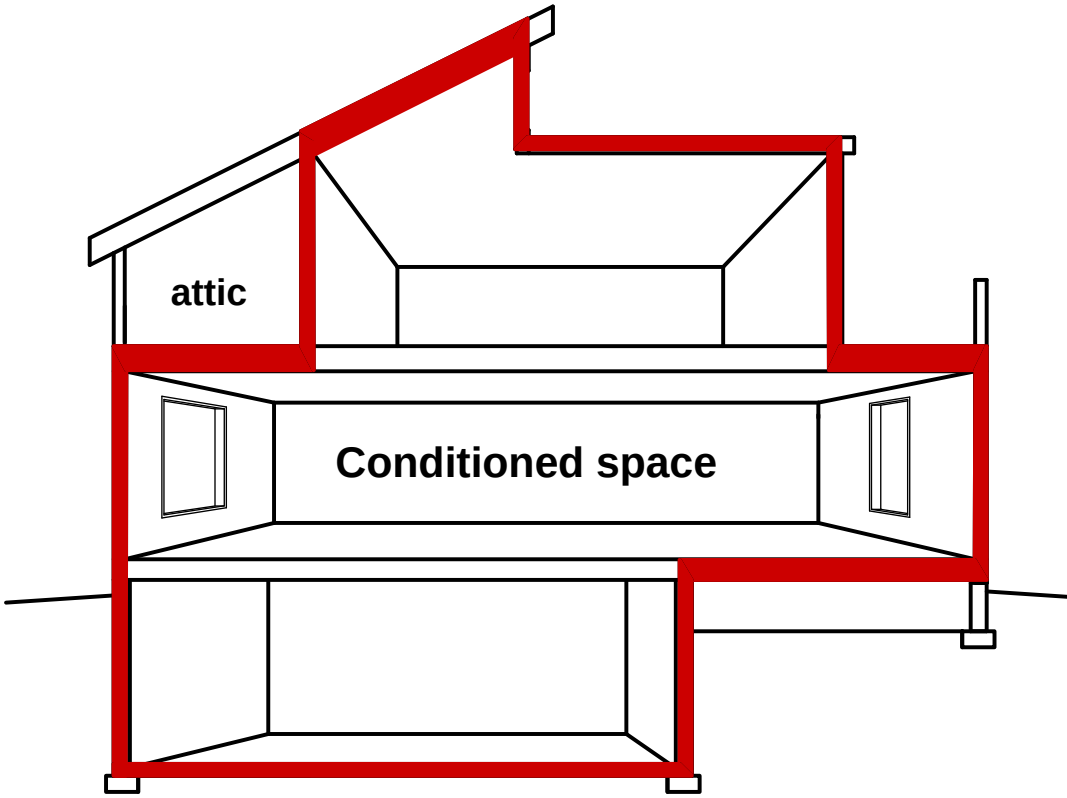
- This proposal subdivides a climate zone, adding complications to the code that were eliminated in the 2004 rewrite of the IECC.
- Calculations by the NAHB Research Center show that basement insulation is not cost effective in the southern part of the climate zone and marginally cost-effectiveness in the north part of that Zone.
- DOE failed to provide documentation of the ratio of heat loss to heat gain in below grade walls.
- Effectively prohibits the use of unfaced batts that are currently permitted by the ICC.
- Based on these deficiencies, we urge disapproval on this proposal.

- . This proposal wants to introduce basements in zone 3 to wall insulation where previously none had ever been required.
- Zone 3 extends down into Southern Georgia, Alabama, MS, New Mexico, and Arizona.

Building Envelope

- The intent of the energy code is to regulate the design of the **building envelope** to enable the effective use of energy.

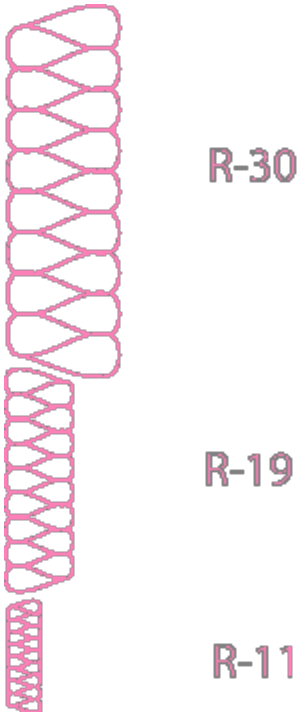
- The **Building Envelope** separates conditioned space from unconditioned space or the outdoors.

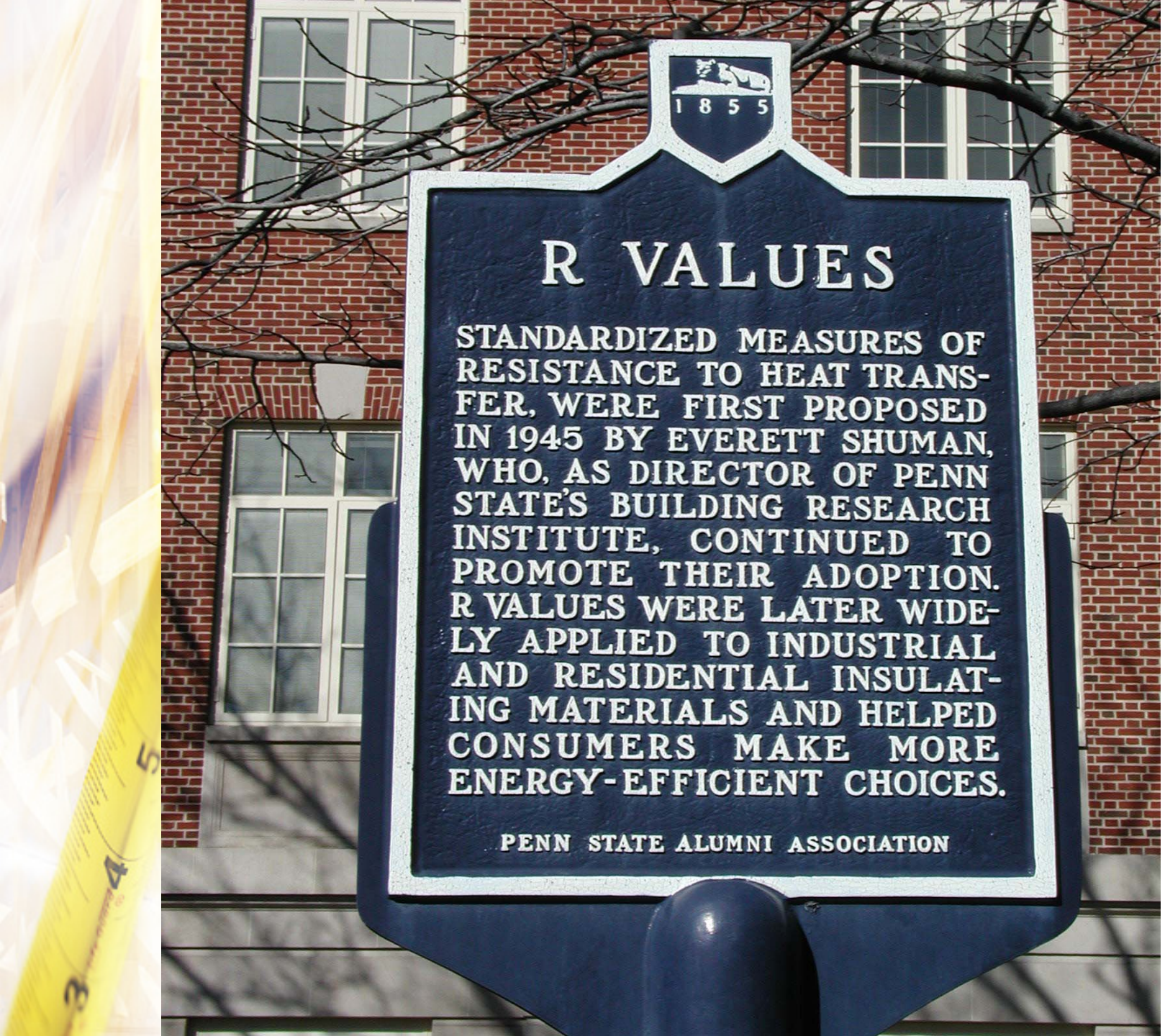


R-Values

R-value is a measurement of a material's resistance to heat flow. Insulation materials have tiny pockets of trapped air that resist the transfer of heat through the material. (The code assumes that insulation is installed properly and is not compressed in any way.) The ability of insulation to slow the transfer of heat is measured in R-values. The higher the R-value, the better the insulation material's ability to resist the flow of heat through it. The picture represents the relative thickness of insulation material at different R-values.

1”= 3.5 r (approx and depending upon density of product)




1855
R VALUES
STANDARDIZED MEASURES OF RESISTANCE TO HEAT TRANSFER, WERE FIRST PROPOSED IN 1945 BY EVERETT SHUMAN, WHO, AS DIRECTOR OF PENN STATE'S BUILDING RESEARCH INSTITUTE, CONTINUED TO PROMOTE THEIR ADOPTION. R VALUES WERE LATER WIDELY APPLIED TO INDUSTRIAL AND RESIDENTIAL INSULATING MATERIALS AND HELPED CONSUMERS MAKE MORE ENERGY-EFFICIENT CHOICES.
PENN STATE ALUMNI ASSOCIATION


InsulSafe III
INCHES
R-VALUE
R-60
R-49
R-44
R-38
R-30
THIS SIDE DOWN
SPACE PANELS

R-values

Heat is transferred in three distinct ways, any or all of which may be occurring at any given time.

- **Conduction -** Conduction is the transfer of heat through a solid object. When one part of an object is heated, the molecules within it begin to move faster and more vigorously, when these molecules hit other molecules within the object they cause heat to be transferred through the entire object. The handle on a cast iron skillet gets hot as heat is transferred from the bottom by means of conduction.

- **Convection -** Convection is the transfer of heat by the movement of a fluid (water, air, etc.) Hold your hand above the stove and you feel the heat as the hot air rises by means of Conduction. Inside of a wall air removes heat from a hot exterior wall, then circulates to the colder interior wall where it loses the heat.

- **Radiation -** This is a direct transfer of heat from one object to another, without heating the air in between, the same process in which the Earth receives heat from the Sun or a wood stove supplies heat to its surroundings.

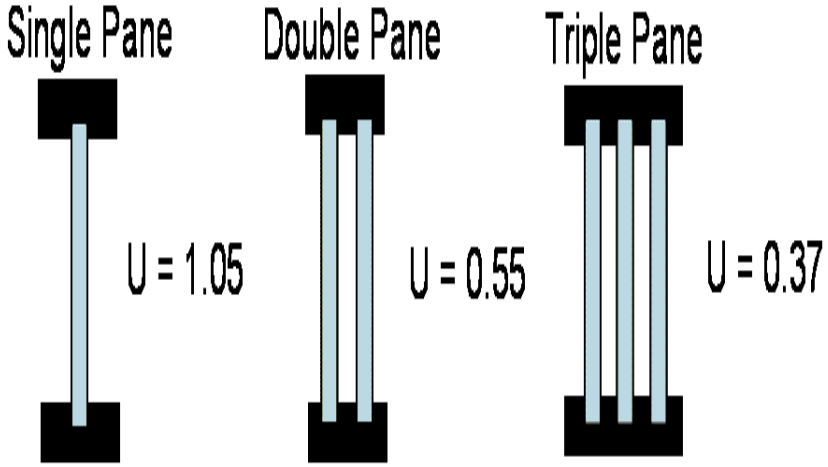
R-values

How does insulation work?

- Insulation is any material that slows the rate of heat flow from a warm area to a cooler one. The more the rate is slowed, the better the insulative qualities of the material. Its ability to resist heat flow is measured as an R or RSI (metric) value, the higher the R - value, the more the material will resist the flow of heat. In order to be effective, insulation materials must be able to reduce the transfer of heat by the three ways we just discussed, conduction, convection and radiation.

U-Factors

- U-factor measures how well a product prevents heat from escaping. U-factor ratings generally fall between 0.20 and 1.20. The insulating value is indicated by the R-value, which is the inverse of the U-factor. The lower the U-factor, the greater a product's resistance to heat flow and the better its insulating value.



Max U-factor and SHGC – Sect. 402.5.1

- .40 U-factor in Zones 4-8
- .50 SHGC max tradeoff in zones 1-3

EC 91 Equipment Efficiency trade-off

- This proposal does not give credit for higher-efficiency appliances as a trade-off for building or water heating using the performance method.
- What are the proponents trying to do? Are they promoting high efficiency equipment or are they promoting energy conservation.
- The proponent is overly concerned that an old furnace could be replaced with a less efficient furnace. This statement could not be any further from the truth.
- Any furnace purchased today would be more efficient than a furnace purchased 5 -10 15 yrs ago. This reasoning lacks credibility

HVAC Efficiency Requirements

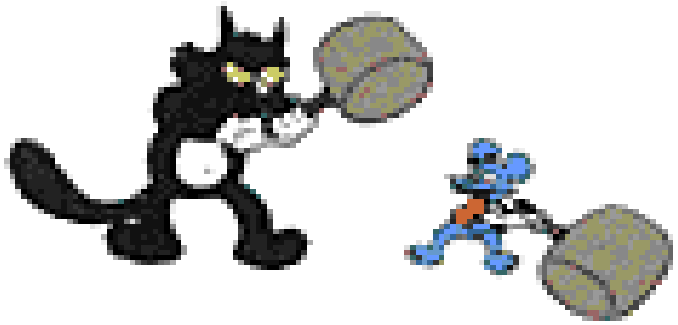
- The National Appliance Energy Conservation Act (NAECA) supersedes the minimum efficiency requirements addressed in the IECC.
- NAECA applies to heating, cooling, and water-heating systems.
- Manufacturers must comply with NAECA, so equipment purchased by a builder should automatically comply with the provisions.

HVAC Terms

- **AFUE -** Annual fuel utilization efficiency; combustion heating equipment efficiency is expressed in terms of AFUE. New equipment typically ranges from about 78- to 96-percent AFUE. Higher AFUE ratings indicate more efficient equipment.
- **HSPF -** Heating seasonal performance factor; heat pump heating is expressed in terms of HSPF. Higher HSPF ratings indicate more efficient equipment.
- **SEER -** Seasonal energy efficiency ratio; cooling efficiency for electric air conditioners and heat pumps is expressed in terms of SEER. Higher SEER ratings indicate more efficient equipment.

Discussion Item

If the builder-contractor and the code official have a disagreement, how can you work it out?



Summary

- Code changes should be based on sound technical, economic, and feasibility analyses.
- Energy efficiency is laudable, but the proof is in the details.