

The Energy Code Trap

What Is The Trap?

Reducing home energy consumption is supposed to benefit everyone. But, what if the building codes destroy your design intent and force wasted money by ignoring greater efficiencies? This is happening in the fenestration section of the IECC wherein custom homeowners are being forced to settle for lesser quality products that cost more money. Specifically, the National Fenestration Rating Council (NFRC) offers window manufacturers a fairly simple way to test, rate and label their entire product line by computer modeling one size rather than testing the actual house sizes and glass types.

The “trap” resides in the fact that actual windows/doors perform substantially better than the NFRC tested products. The test sizes chosen by the NFRC are typical of tract housing products and not custom-built homes. For example, the sliding door test specimen is 6’6” x 6’6” (43 sq. ft.) but Fleetwood commonly sells sliding doors that are 24’ x 12’ (288 sq. ft.). In these sizes, the NFRC tests at .47 U-Value but the actual door tests at .32 U-Value.

Homeowners that simply accept the NFRC energy value are quickly faced with an onslaught of costly “upgrades” that are not sensible. Two prime examples: High Performance Glass and Thermally Broken Aluminum (TBA).

High-Performance Glass?

At first glance the prospect of high-performance glass is wise. On closer look, “upgrading” to this glass changes the design intent of the house by making the glass darker, greener or more reflective. The house now resembles a commercial building more than it does a luxury residence AND ends up costing the homeowner more money.

Thermally Broken Aluminum?

Thermal break aluminum (TBA) products were created for extreme cold climates where the tradeoffs are prudent since TBA still outperforms wood, steel and vinyl in most categories. However, an overemphasis on the u-value (see U-Value for more information) has created an architectural and building conundrum. Specifically, code changes “seem” to direct buyers to products and options that diminish the beauty of the project and create building challenges:

1. Daily Use Challenges:
 - a. TBA will not noticeably reduce heat transfer in arid climates because the extrusion cavities are heated regardless of the thermal material.
 - b. Thermal twisting is a scientific reality (**see [Solar Expansion/Thermal Twisting](#)**)
2. Costly:
 - a. TBA products require more parts and processes, which increases the cost over non-thermal products (Compare the cross-section details of a thermal vs. non-thermal sliding door.)
 - b. Custom finish orders require additional set-up charges to accommodate the thermal material.
3. Weaker:
 - a. The added plastic weakens the aluminum structure, which affects wind load, deflection and operation.
 - b. Sizes are limited EVEN with high performance verticals.
 - c. Fleetwood has chosen NOT to design a thermally broken Entry Level line because less material =lower cost and inserting a thermal break makes it even weaker.

4. Longevity Diminished:
 - a. Thermal Shrinkage is a phenomenon, which illustrates the volatility of thermal material.
 - b. The connection points (aluminum/plastic) are weaker than solid aluminum.
 - c. Long-range maintenance (glass replacement...) is more difficult since plastic is fragile.
5. Not As Attractive:
 - a. Obvious black plastic lines.
 - b. Bulkier shapes required to compensate for inherent weakness
 - c. Some manufacturers have multiple snap-in pieces.

Compliance Tools

1. The first priority should be to discover the compliance method being used on the project.
 - a. Tract houses or remodels will use the *prescriptive* method whereas custom projects will use a *performance* method wherein software is used to balance tradeoffs of building components (see [Energy Code Compliance](#).)
 - b. If the project is using a performance method the “must be X –u-value” is likely a wish list or starting point since it is likely the required value for the prescriptive method.
2. Quote the house AS DESIRED.
 - a. Fleetwood provides a summary of the relevant NFRC energy test results (SHGC and U-Value).
 - b. Deliver these values early to the project’s energy consultant and direct them to make it work.
 - i. Other areas of the envelope can be upgraded to offset energy values of the windows, **which does not compromise the design** and will save money.
 - c. If certain windows/doors need to be changed to those of higher energy results, AVOID changing the sliding and hinged doors as these are typically larger and therefore impact the overall project more than windows.
3. Make ONLY thoughtful scope changes:
 - a. Fleetwood offers a free custom energy report for each quote and order.
 - i. The Authorized Dealer will provide this report upon request.
 - ii. The same computer modeling software used by the NFRC to create existing reports (see example) is applied to the exact sizes of the project.
 - iii. The **custom reports are the MOST realistic energy testing results** for a custom home and typically produce improved performance with greater architectural beauty and all for less money.