



Mr. Doug Anderson  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N. W.  
Washington, DC 20460

September 28, 2012

Doug and Emily:

On behalf of the Aluminum Extruders Council, thank you once again for the opportunity to comment on the proposed revisions to the Energy Star® program for Windows, Doors, and Skylights. The Aluminum Extruders Council (AEC) has approximately 135 members representing around 75% of all aluminum extrusion lines in the U.S. and Canada, including the frame lineal suppliers for both commercial and residential windows. Over 90% of all commercial fenestration is aluminum framed. Aluminum holds a lower share of the total residential window market, but aluminum is still a dominant material in the south where structural and durability concerns are paramount.

Building on our positions from our previous Nov 18, 2011 comments, I will focus on a few clarifications and key points.

## **Southern Zone Analysis**

Our primary concern is about the Southern Zone and the potential impact on aluminum framed windows. The U-factor in the Southern Zone is being reduced by 33% when the dominant factor in this climate is SHGC, not U-factor. This seems out of balance when the U-factor is being reduced by only 10% in the north, where U-factor *is* the key factor.

### *Incorrect Estimate of Market Share*

In the Version 6.0 Draft 1 Criteria and Analysis Report from July 2012, the potential impact on aluminum framed windows was minimized:

EPA's analysis of the CPD found that 0.2% of currently qualified windows in the Southern Zone have aluminum frames, and this market share would be reduced to 0.1% under EPA's current proposal. EPA believes that at such low market shares, consumer choice would not be reduced in a significant manner. (page 26)

However, this market share is grossly underestimated in the Southern Zone. Both the CPD and "Top 20" product availability data are national databases and particularly dominated by national nonmetal window manufacturers. As such, they cannot be used to accurately assess regional market share in one zone. Aluminum lowrise residential products are not used nationally, but are a significant portion of the market in the south, such as Florida, Arizona, and

Texas. This is due to regional factors such as the warmer climate, durability, and structural performance. Aluminum frames avoid frame distortion and degradation in hot climates (and the resulting increases in air infiltration), and provide structural benefits for tropical storm and hurricane events along the Gulf Coast and Florida. Aluminum framing provides an important way to cost-effectively meet these requirements, while also being a sustainable, green material with proven recyclability. Recyclability and more efficient use of materials reduce the ecological impact of a building by reducing landfill waste, and energy and emissions associated with manufacturing, transportation, and disposal.

In contrast to the analysis report, Ducker shows that aluminum residential windows make up 8.1% of the total residential window market,<sup>1</sup> so considering that the share of residential aluminum in northern climates is minimal, the percentage in the southern zone is even higher. For instance, Ducker shows the market share in Florida at **35%**,<sup>2</sup> and individual companies report higher shares of **65-70%** on a regional basis. Thus, the statement that consumer choice would not be reduced in a significant manner is not correct, especially if this market share is cut in half as predicted in the report.

#### *Overstated Energy Savings from Reduced U-factor*

Additionally, we question some of the results regarding energy savings and cost effectiveness in the southern zone. Just looking at the proposed U-factor change, EnergyGauge and RESFEN runs in ten cities in IECC Zone 2 show an average energy cost savings of only \$21 per year, and zero or *negative* energy savings in IECC Zone 1 (including Miami). This seems to be in strong contrast to the \$98-194 savings per year estimated in the report, even if the report included a larger percentage of electric baseboard heat in older homes. Furthermore, the incremental cost of \$33 per window is too low, and does not seem to include the cost of adding a thermal break, thus understating the payback period. Altogether, while we agree that SHGC is an important factor and there are energy savings to be had, we wonder if the heating savings from lower U-factor has been significantly overstated for this zone.

#### *Path Forward: Equivalent Energy Performance*

But regardless of the questions about the energy analysis, how should we move forward? We understand the pressure on EPA to use the 0.40 U-factor taken from the prescriptive table in the 2012 IECC for zone 2. While we do not believe this has been technically justified in places like Florida and Arizona, and certainly not for Zone 1 (Miami, Hawaii, Puerto Rico) where the code specifically sets no U-factor requirement, we will not challenge this baseline requirement. However, the 2012 IECC provides other options for compliance that Energy Star seems to be ignoring.

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<sup>1</sup> Exhibit D.2, "Study of the U.S. Market for Windows, Doors, and Skylights", Ducker Research Company, AAMA, and

<sup>2</sup> Appendix C, *ibid.*

If a product provides equivalent energy performance as the baseline prescriptive criteria, it complies with the code through Section R102 (Alternative Materials – Method of Construction, Design, or Insulating Systems) or Section R405 (Simulated Performance Alternative). Thus, a product with U-factor higher than 0.40 can still be consistent with the code as long as the *overall* performance is the same or better.

An equivalent energy performance option was evaluated for the north, and we strongly support that. Performance-based criteria are core to one of Energy Star’s guiding principles to account for equivalent functionality and performance of different product technologies. Conversely, it is discriminatory and misleading to the consumer if one product is allowed to get the Energy Star label, and an equivalent or better performing product is excluded.

*However, we strongly question why an equivalent performance option was not also evaluated for the Southern Zone.* In this case, a lower SHGC can be used to offset changes in U-factor. Based on the previous performance option developed for this zone by LBNL, we suggest the following:

| U-Factor  | Max SHGC |
|-----------|----------|
| ≤ 0.40    | 0.25     |
| 0.41-0.42 | 0.24     |
| 0.43      | 0.23     |
| 0.44-0.45 | 0.22     |
| 0.46      | 0.21     |
| 0.47-0.48 | 0.20     |

This extends the range of consumer choice and technology, while providing the consumer equivalent energy performance consistent with the code.

## Other Issues

In regards to other points,

- We believe an error was introduced into Version 5 of Energy Star, namely that the criteria for **glass doors** do not vary by climate zone. While this may have been a reasonable simplification for opaque doors, it makes no sense to ignore climate variation for sliding glass doors, which perform much closer to windows when considering energy performance. These products have important differences in SHGC and U behavior from south to north. In the south, the consumer is paying for a low U-factor they don’t need (lower even than the window criteria), and in the north, they are having a very low SHGC forced on them that

actually harms energy performance. In addition, this low SHGC makes it difficult to match glass appearance between the glass doors and the windows in the north, leading to consumer complaints.

We suggest that you apply the proposed door criteria to only opaque and < ½-lite doors, and for > ½-lite doors (or at least sliding glass doors), use the window criteria.

- We thank you for confirming that the **scope** of the Energy Star program for Windows, Doors, and Skylights only applies to products in lowrise residential buildings, and does not apply to nonresidential nor highrise residential buildings, which are covered through other EPA Energy Star programs for buildings that stress whole building integrated design. This has been a point of confusion with architects, so this is an important clarification.
- Regarding the **northern zone**, we want to be consistent with our discussion of the southern zone. In this case, U-factor matters much more in the north than the south. A 33% reduction in U-factor was proposed for the south, but only 10% for the north. We believe the technology is ready, available, and cost effective to go further, such as a U-factor of 0.25. We also believe the role of SHGC in the north should not be ignored – in this case, the positive benefit of higher SHGC. Arizona and Maine are simply not the same. We support extending the equivalent performance option, and also establishing a minimum SHGC in the northern zone. This need not be too aggressive, but just set conservatively to limit ultra-low SHGC glass that harms energy efficiency in the north, such as SHGC > 0.30.
- We understand that EPA does not feel Life Cycle Analysis (LCA) is ready to be included in this version of Energy Star, but will continue to monitor developments in fenestration LCA, and reassess as warranted. Besides LCA, we also encourage EPA to more generally consider potential **environmental impacts** when making proposed changes, such as in the Southern Zone.

Thank you again for your consideration, and please feel free to contact me at any time if you have any questions or would like further details.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas D. Culp". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Thomas D. Culp, Ph.D

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