

VELUX America Inc.

Comments Regarding:

**ENERGY STAR® Program Requirements
Product Specification for
Residential Windows, Doors, and Skylights**

**Eligibility Criteria
Draft 1 Version 6.0**

Issued September 28, 2012

The following comments are in response to the above document and the accompanying Analysis Report issued by the U.S. Environmental Protection Agency (EPA) on July 26, 2012. They follow on comments submitted by VELUX® in November 2011 on EPA's Framework Document, and face-to-face discussions held with EPA and D&R International in Washington.

We appreciate having the opportunity to lend our skylight perspective to EPA and its assisting organizations, and believe the participative process used is essential to a balanced and effective program which is faithful to the ENERGY STAR Guiding Principles. Adherence to those principles has built the ENERGY STAR brand into one of the most powerful aspects of our national energy efficiency performance, and VELUX is proud to have actively participated in the program throughout its evolution.

Continuing our participation as an ENERGY STAR Partner following each successive program revision has typically been an easy business decision for VELUX, and we sincerely hope we can make the same decision following the Version 6.0 development process. In that spirit we again offer our unique industry perspective in the following statements. They result from analysis that goes beyond what was presented in the Analysis Report, based on specific research into the state of the current skylight market. We also remain committed to providing further assistance as appropriate, because an effective program enhances our contribution to the national productive economy as a viable business.

In addition to these comments filed on behalf of VELUX, we are an active participant in the groups at both AAMA and WDMA that are formulating separate comments from the overall industry perspective, and we remain active at NFRC to further their relevance to our constantly evolving industry.

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We have recently shared with EPA our clearest view of the U.S. residential skylight landscape, and in many respects that view suggests that EPA needs to make adjustments to the basic energy performance criteria presented in Version 6.0 Draft 1 for the skylight segment. Several unique features of that landscape are listed here:

- The price-elasticity curve for adding skylights into a building, or replacing existing skylights, is much steeper than for windows and doors. This comes directly from our major dealer customers who have indicated that even price increases of only \$20 to \$40 over currently qualified products will drive too many of their customers away from ENERGY STAR skylights. (Future energy savings and the resulting cost effectiveness estimates are not realized when the products cease to be affordable.)
- One or two manufacturers take the lion's share of the total residential skylight market and operate beyond self-imposed regional boundaries; a similarly small group of other, regionally focused skylight manufacturers command only a small slice of the residential market sales yet they dominate the NFRC CPD listings by a large margin. This tells us that the CPD is not very useful as a surrogate for the "broad availability" of qualifying products called for in Guiding Principle #4.

In our earlier discussions with program staff, it was stated that our wired economy allows people to order products from anywhere anytime, therefore the issue of regional focus by the manufacturers who hold the majority of qualifying listings is no longer an impediment to product availability. While the mechanics of placing orders makes it possible, the added costs to the customer to ship by truck (which can frequently be more than the price of the product) has certainly not been factored into the cost effectiveness analysis. In addition, shipping via common parcel carriers is often not an option, due to size and packaging limitations and increased likelihood of product damage. For these and other reasons, our experience is that less than 1% of sales of the types of products we offer are internet sales. Regionality does matter.

- Market data currently relied upon by EPA to define the current ENERGY STAR market penetration assumptions did not encompass the true distribution of unit sales among all NFRC participants and non-participating entities. Therefore: 1) rather than a 99% ENERGY STAR market share for glass skylights cited in the report, we have furnished data indicating that the true penetration cannot be more than 76%, and is likely to actually be significantly lower; and 2) the report also indicates that overall ENERGY STAR market share for skylights with any glazing material is estimated at 70%, where our submitted data clearly shows the true share is not more than 60%. Relative to the

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80%+ windows market share, skylights deserve to be treated LESS harshly, not more so as the proposal does.

- There are distinct sub-types of skylights which serve different conditions and regional preferences, and with unique performance limitations, that were not individually studied in the Analysis Report. The main sub-types are: fixed curb mount, fixed deck mount, venting curb mount, venting deck mount, self-flashed, and TDD. Since a “least common denominator” process using the least efficient sub-type (double-hung) was employed for the window criteria, EPA is strongly urged to similarly treat our segment in setting the new bar for all skylights.
- The use of skylights (even without blinds) in optimizing the fenestration distribution of new homes when designing for adequate daylight has recently been proven to save significant heating and cooling energy in all climate zones. This fact is not recognized in the traditional simple approach that only uses product parameters, but should be factored into decisions that adversely affect the affordability of skylights.

VELUX has presented data and analysis confidentially which quantify the above statements and support the requested actions. Upward adjustments are clearly warranted in the proposed performance criteria for U-Factor and SHGC for skylights. We trust EPA will recognize the need to take a deeper look into their feasibility and cost effectiveness analysis while factoring in this more recent and detailed data.

Returning to the overall skylight landscape, we present alternate criteria in the chart below:

ENERGY STAR ZONE	MAX. U-FACTOR (@ 20°)				MAX. SHGC			
	VELUX 2010	Actual V 5.0	EPA Proposed V 6.0	VELUX Proposed V 6.0	VELUX 2010	Actual V 5.0	EPA Proposed V 6.0	VELUX Proposed V 6.0
N	0.55	0.55	0.45	0.50	0.40	Any	0.35	Any
N-C	0.55	0.55	0.47	0.53	0.35	0.40	0.30	0.35
S-C	0.57	0.57	0.50	0.55	0.32	0.30	0.25	0.30
S	0.65	0.70	0.60	0.60	0.30	0.30	0.25	0.28

For perspective, we looked at the true residential products listed in the current CPD that would meet the above criteria line-ups. Here some key observations based on that review:

- Only 38% of fixed curb mount listings currently qualify in all four zones, compared to 79% of fixed deck mount listings. The VELUX proposal lowers that measure to 26% for both sub-types.

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- 47% of double-pane fixed curb mount listings currently qualify in the Northern zone. The EPA proposal lowers this to 0.7%, while the VELUX proposal lowers it to 23%. By contrast, Figure 10 of the report shows at least 60% of double-pane double-hung window listings would qualify under EPA's proposed criteria for windows.
- Less than 60% of the triple-pane venting curb mount listings will qualify in the Northern zone under the EPA proposal.

These alone should be convincing evidence that EPA may have been unreasonably harsh in its treatment of some skylight sub-types, and that the VELUX proposal achieves significant movement even when it may not be justified.

It is our perception that even though EPA did not intend it, the proposed criteria looks to us like a fine "Most Efficient" program. We base this on the severe reduction in the number of currently available double-pane products offered nationally resulting from the criteria, especially in certain sub-types. For example, less than 2% of the double-pane curb mount sub-type CPD listings would be qualified in the Northern zone under EPA's proposal.

If the proposed criteria go forward, one expected result is that West Coast retailers will find it extremely difficult (if not impossible) to justify offering qualifying products in the curb mount sub-types.

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Apart from traditional skylight sub-types, some of the data we recently provided also indicates that criteria for TDDs should no longer be based on the skylight criteria, since the analysis did not account for the most recent test data which shows a significant upward shift in the measured U-Factor capabilities of all models in this sub-type tested in the last year. We will provide test report documentation of this development for the two VELUX models with the largest market share, as requested by D&R.

Our Version 5.0 recommendation for TDD's is one way EPA could deal with TDDs given this emerging data: TDD's should be considered qualified if a dual diffuser at ceiling level is used, the air leakage requirement of 0.3 CFM/FT² is met, and component material requirements contained in the NAFS Specification are met. We believe EPA can justify this change based on the following:

- TDDs are often used where no other fenestration product is feasible. (Many green building programs even award points in such instances.)
- TDDs are effectively "ENERGY STAR Lighting" qualified, as they require no wattage to operate during the day.

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- TDDs are merely 1.1 square foot or less in area for typical residential installations (at 14 inches in diameter or less), so the actual Btu loss per unit is quite small even for U-factors above skylight qualifying criteria. (Given their high light efficacy this is a reasonable trade-off.)

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Regarding the other proposed program requirements, we concur generally with comments submitted by our trade associations. One aspect we want to strongly support is the requirement for manufacturers to provide detailed installation instructions. This is critically important for skylights, because of the vulnerability to leakage of sloped products that are often installed by roofers with a propensity to do it “their way” when good instructions are not provided.

It is unreasonable, however, for EPA to require manufacturers to anticipate all of the possible installation conditions that may be encountered. That is one reason long-standing and reputable manufacturers such as VELUX maintain staff with broad installation experience and are available to consult with customers encountering unusual circumstances our many installation documents may not fully address.

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In closing, we hope EPA realizes that VELUX holds a long-standing affinity with the whole set of principles espoused by ENERGY STAR, and that our preference is to continue our partnership with the ENERGY STAR brand for a long time to come. However, we must also be cognizant of the business risk posed when technology advancement is the overriding justification for setting the bar beyond the market’s ability to absorb it and manufacturers’ ability to recover the investments necessary to achieve it.

We offer to work further with EPA and D&R as they continue the revision process, and stand ready to help them assess the validity and potential impact of our concerns.

Thank you again for the opportunities to share our insights and our analysis.

Submitted by Tim Miller, John Lawton and Roger LeBrun