

The logo for VELUX, featuring the word "VELUX" in white, bold, sans-serif capital letters on a red rectangular background.

Skylights

U.S. EPA

Via e-mail delivery to: [windows@energystar.gov](mailto:windows@energystar.gov)

VELUX America Inc.  
PO Box 5001  
Greenwood, SC 29648-5001

864-941-5360 Phone  
864-941-4870 Fax  
[www.veluxusa.com](http://www.veluxusa.com)

Your reference  
October 2011 Document

Our reference  
29-0

Date  
November 18, 2011

**Subject: ENERGY STAR<sup>®</sup> for Windows, Doors, and Skylights  
Version 6.0 Product Specification Framework**

VELUX America Inc., a long-time ENERGY STAR Partner in both the U.S. and Canada, is pleased to have the opportunity to comment on the subject Framework Document we received via e-mail on October 14. We respectfully offer what we believe to be constructive, informative, and appropriate comments intended to strengthen the program and advance all of its goals.

We will first respond to the specific questions EPA is requesting partners to address, followed by additional comments on other concerns with the document content and its background. Headings and questions in a different font are copied from the document. Please keep in mind that our focus is on unit skylights and TDDs.

**Answers to Posed Questions**

**II. Program Elements Considered for Adoption**

1. Is there compelling data demonstrating that any of these proposals should be reconsidered during this criteria revision?
2. Is there compelling data or research demonstrating that any of these proposals should not be considered (or, alternatively, should be given special attention) during the next criteria revision?
  - Regarding **(a) Structural Requirements**, we would ask EPA to take a longer look at this issue after the true scope of products currently certified to meet the NAFS standard is defined.
    - Besides AAMA and WDMA, many qualifying products (particularly for unit skylights and TDDs) are certified by NAMI and Keystone.
    - Manufacturers typically do not invest structural testing dollars in "special order" products that may be listed in NFRC's CPD but are too rarely purchased to justify the expense.

EPA should consider weighting their "market count" CPD analysis based on the entries that are recognized by any of the four agencies as compliant with NAFS.

Also, as implementation of the verification process continues, certification as NAFS-compliant can play a major role in underpinning that program enhancement.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 2

- Regarding **(d) Daylighting**, we request that EPA formally acknowledge the following facts:
  - People buy windows and doors for a lot of other reasons, but people choose to buy skylights and TDDs mainly for the lighting benefit and the “drama” provided by the light (not the product aesthetics)
  - There is a close relationship between VT and SHGC, especially now that the practical limits of selective coatings has been reached
  - The incident light on a product mounted in the roof is significantly higher than that incident on vertical products, so the area of roof-mounted glazing required for daylight is much less. We are aware of new studies showing that energy savings will result, in all climate zones explored, when daylight-driven glazing layouts are optimized in new construction and major additions. We can provide details of these studies on request.
  - Skylights and TDDs are better placed to transmit that daylight directly to the occupied parts of rooms
  - Many rooms and hallways cannot get any daylight without toplighting if they do not have an exterior wall
  - Operable unit skylights enhance natural ventilation due to the stack effect (warm air naturally rises)

Perhaps it is time to specify minimum *light-to-solar gain* (VT/SHGC) ratios. This is particularly appropriate for unit skylights, but TDDs will need an exception until they can be rated for VT.

**III. Program Elements Remaining Unchanged**

1. Are there any compelling reasons to require TDDs to meet a distinct set of criteria from traditional skylights?
  - No, not based on current testing technology. Using the same criteria makes sense to the likely beneficiaries (the customers), and keeps the program simple. Also, the latest model U.S. building codes include TDDs in their *Unit Skylight* definitions. If at some future time a “Most Efficient” category is applied to this program, or if new research can support it, separating them out might be appropriate.
2. Do any manufacturers anticipate not being able to complete the physical test for their products before the NFRC-specified deadline in March 2012? If so, why?
  - VELUX took heed of the looming deadline for ceasing the use of simulation, and has completed the conversion of all TDD ratings to the test-only method. This cut-off date was announced by NFRC in plenty of time for all manufacturers to have done the same.

**IV. New Additions to Program Requirements****a. Air Leakage**

1. How many manufacturers are currently testing for air leakage? For those not already testing, what are the projected costs associated with adding air leakage testing? Do manufacturers anticipate a product price increase to the consumer? If so, how much?
  - VELUX has always tested for air leakage. It is part of the testing for certification to the NAFS standard, with which we have been in compliance since its inception.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 3

2. Approximately what percent of your company's products already meet and are labeled according to the above-specified air leakage criteria? What percent of your products are tested, but not labeled? What is the cost associated with beginning to label these products?
  - The vast majority of our products intended primarily for residential buildings are certified and labeled as compliant to both NAFS and NFRC requirements. Labeling is not an insignificant cost, but it is essential for code compliance. We have labeled them since our ENERGY STAR partnership began.
3. Are there any concerns about the ability of windows, doors, or skylights to meet the above-specified air leakage criteria?
  - For unit skylights and TDD domes, which are more susceptible to interior condensation due to their position in the warmest space in the room, the air leakage limits are more challenging to meet when provisions must be made for condensation to be drained through the product onto the roof. That said, it has proven to be possible for well designed units to do both tasks, even for venting products.
4. Should air leakage results be available to the public via the CPD (or the forthcoming CPD-based ENERGY STAR search feature)?
  - The only test result that should be visible to the public is whether the product passed or failed to meet the criteria. Listing actual values is unnecessary and could be misused and misunderstood in the marketplace.
5. What is a reasonable timeline for implementation of this requirement?
  - Code compliant products meet this requirement now. It should be made effective immediately upon implementation of Version 6.0. Please include all certification agencies currently authorizing manufacturers to label, not only AAMA and WDMA.

**b. Installation Instructions**

1. What basic elements would be most valuable in installation instructions (e.g. diagrams, flashing instructions, attributes of insulation or air sealing materials, etc.)? What are potential obstacles to requiring these items?
  - All of the above elements are important to include in instructions for the commonly encountered field conditions. Manufacturers should not, however, be expected to provide instructions for all conceivable site conditions. Unique sites should be handled by professionals acceptable to the local jurisdictions.
2. What is the best way that partners have found to share installation info with customers? Should EPA consider any alternative or supplementary methods for educating consumers on proper installation of fenestration products?
  - VELUX has found it best to include professionally printed and graphically rich installation instructions in every product package. We also make electronic versions of these same documents available to the public on our website. In no way would it be wise to default to "generic" instructions that do not take into account the critical elements determined by the manufacturer for their unique designs.
  - VELUX believes so much in good instructions that we are currently the only unit skylight manufacturer with a "No-Leak" installation warranty (10 years long) for all of our standard, listed glass products, when the installer (whoever they may be) follows them exactly.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 4

**V. Proposed Revisions to Product Criteria****c. Skylights**

1. What are the performance criteria for your company's most commonly sold ENERGY STAR qualified skylight?
  - Our biggest selling product line would only qualify in the North-Central zone using the proposed criteria ranges/values.
2. What are the potential cost impacts of the proposed criteria ranges to the consumer and to your company?
  - Providing qualified products to replace those that would no longer qualify would likely involve variable cost increases in the 20% to 30% range, which would have to be borne by either the customer or the employees of VELUX, and unknown but significant capital costs to increase the capacity of the plant to produce new glazing units that would be necessary. (Note: These costs are for superefficient double-glazed IGUs, not new triple pane designs.)
3. Are there specific criteria you find particularly concerning? If so, why? (Please provide data substantiating your particular concerns.)
  - Any SHGC criteria that is lower than window SHGC in a given zone is not only unjustified, it is contrary to the goal of saving energy. The studies referenced in our response to question II.2 would help explain this assertion, and they even suggest SHGC's higher than windows would save more energy.
  - We know of no reason for a SHGC requirement in the Northern zone, especially when there is no requirement for windows.
  - We believe EPA has pegged all proposed skylight/TDD criteria 0.05 to 0.10 too low. We cannot currently provide hard data to refute EPA's analyses, since they have not shared with us the details of their methodology. We do know that the Ducker study is very suspect for their unit skylight market assumptions and conclusions, and that the CPD line items should be further analyzed for true availability and affordability. Only those products, and all of such products, people actually choose to buy in significant numbers and which are readily available should be included in the denominator of the market penetration percentage determination.
  - The vast majority of grossly inefficient existing skylights that should be replaced are "curb-mounted". Due to a quirk in NFRC procedures, U-factors for this subset of new unit skylights are typically about 10% higher than similarly glazed "deck-mounted" or "inset-mounted" types, resulting in the bulk of curb-mounted units falling short of the proposed criteria. Customers who might be inclined to replace their old units because they are assured of affordable ENERGY STAR qualified options will lose a key motivator to replacement. In addition, since tax credits and above-code programs have traditionally used ENERGY STAR as a qualifying level, this reveals a serious market drag the levels being proposed would cause. The net result: major energy saving opportunities evaporate for this segment.

We estimate that about a third of the 30 million(±) existing residential unit skylights are plastic-glazed, and that close to 30% of the annual sales of residential unit skylights are plastic-glazed (excluding TDDs). Most of these are the curb-mount type.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 5

- At the bottom of Page 10, EPA asserts “efficient skylights with double glazing would be able to earn the ENERGY STAR label”. We are eager to learn what EPA considers an affordable “efficient” double-glazed product construction, because we would consider our standard IGU (95% argon-filled, triple low-E, warm-edge spacer), wood-framed or foam-filled plastic-framed products to be about as efficient for use anywhere in North America as could be found anywhere. Yet, many such newly developed products (introduced at the same time the “Phase I criteria changes took effect) which we produce every day would no longer qualify under the proposed ranges and values. (We remind EPA that windows are required in all code-minimum buildings but skylights are not, and thus are subject to quick elimination where small changes in price can be a deal-breaker.)
- The text also states “all skylight analysis and research has been limited to glass skylights”, implying that the CPD listings for widely available unit skylight products glazed with something else and often used in residential construction were ignored in aggregating the overall size of the market for residential buildings. This indicates a material bias exists. Does EPA exclude aluminum framed units from their window market analysis, or make any other arbitrary decisions based on materials?

If the resulting proposed criteria go forward, EPA would effectively have defined criteria that could best be described as “Most Efficient” qualifying levels for the unit skylight category. We sincerely hope this was not the intent.

If we have assumed wrongly, we look forward to reviewing the details of the market analysis used by EPA.

**Additional Comments (Specific to other aspects of the Framework Document)**

1. At the top of Page 2, it was stated that EPA modeled savings using RESFEN 6. Although we do not profess to be expert in that tool, we understand it does not completely model the energy effects of toplighting, and may not reflect the most current model codes. If the tool was used for justification of the skylight/TDD values proposed, we would like an opportunity to investigate the results related to those concerns.
2. Accurate LCA’s that cover all manufactured fenestration types is something we support, but only if the “use phase” impacts are properly accounted for. The “state of the art” currently does not take this phase into account. (We also concur with comments being submitted by AAMA and WDMA regarding the inaccuracy of the statements about the cancelled “windows” LCA effort.)
3. During the development of Version 5.0, VELUX suggested qualifying levels for the anticipated 2015 Phase 2 criteria changes. With the new studies we have mentioned earlier, we are even more convinced those levels would yield much more aggregate energy savings than the levels in the Framework Document.
4. In the paragraph under the proposed skylight criteria chart on Page 10, EPA states they reviewed skylights “available for sale”. We request information about what is meant by “available for sale”, and we trust EPA will explore necessary changes in current distribution infrastructure to get those “available” qualifying products to the entire country and will include the associated added distribution costs in any cost-effectiveness analysis.

A significant portion of residential unit skylights and TDDs are sold through the “home center” distribution channel. EPA should find it useful and interesting to learn that the largest of these (ENERGY STAR Partners *The Home Depot, Lowes, Menards, and ABC Supply*) do not carry any of the products listed on NFRC’s CPD from the two manufacturers that own over 75% of all the unit skylight CPD line items.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 6

5. We request that implementation be scheduled to take effect no earlier than 2015; this is especially critical to the skylight segment if the final criteria values are similar to those offered in the Framework. This is the worst time to saddle our sagging industry (and overall economy) with the financial burden of striving to meet tougher levels than we have suggested.
6. Many VELUX products are currently ENERGY STAR qualified in some Canadian zones, as well as all of the U.S. The pressure of levels proposed here on the Canadian ENERGY STAR criteria changes being developed could essentially close out our partnership in Canada without new, expensive and unwieldy triple pane units that have not been unproven durable in sloped positions under heavy snow loading.

**Additional Updated Comments (first offered in development of Version 5.0 that are still germane)**

1. VELUX worldwide has always pushed the efficiency envelope for fenestration on dwelling units, and has no intention of changing that demonstrated commitment in our future product improvements. We have also seen, through that market-leading position, how difficult it can be to achieve widespread acceptance of new technology in discretionary (if green) amenities such as toplighting in homes. We offered Phase II criteria limits that attempt to make realizable improvements in aggregate energy use, without jeopardizing the entire category's viability in the market (we hope!).
2. VELUX offered more aggressive changes in the zones that stand to benefit the most from those changes (U-Factor in the north and SHGC in the south), and slightly smaller changes as we move away from the extreme zones. Products qualifying under our last proposal are better than 2012 IECC in the extreme zones, and can also be significant contributors to energy savings in the central zones.
3. With the exception of the "25% of market" differentiation goal expressed in the ENERGY STAR guidelines, we generally agree that all other guidelines are appropriate for the unit skylight segment. Hitting close to that goal in our concentrated segment is going to be a challenge, particularly when all glazing options are included in the aggregate market assessment.
4. The TDD market does represent a different typical use (smaller rooms and hallways) from the preponderance of unit skylights. EPA is advised to separate the subsets in their market analysis, which might suggest a somewhat different approach between unit skylights and TDDs.
5. Any incremental cost analyses and cost savings calculations should factor in all the above comments. In addition, they need to: 1) include an assessment of price elasticity for buying and installing unit skylights, recognizing that the decision to install or replace is highly discretionary; 2) recognize the unique skylight market characteristics; and 3) account for the significant costs of converting regional manufacturers to national ones should the final proposed criteria assume that would be needed. Otherwise, no economic analyses could be considered realistic.
6. We would like to encourage EPA and its assisting organizations to continue the open and considerate process under which the effort to modify the qualifying criteria have been conducted in the past by DOE.
7. 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. We generally support their efforts to help make the final fenestration product criteria truly effective as energy savers.

**Comments on ENERGY STAR® Version 6 Windows, etc. Framework**

29-0

Page 7

Thank you for allowing us a voice, and we trust our input has been well-received thus far.

Best regards,



Roger LeBrun  
Senior Product Certification Engineer

Direct phone: 864-941-4828

Office fax: 864-941-5000

[roger.lebrun@velux.com](mailto:roger.lebrun@velux.com)

<http://www.veluxusa.com>

c: Doug Anderson, US EPA  
Steve Hopwood, NRCan  
T. Miller  
N. Moxness  
J. Lawton

-/RLE