

**DOCKETED**

<b>Docket Number:</b>	19-BSTD-03
<b>Project Title:</b>	2022 Energy Code Pre-Rulemaking
<b>TN #:</b>	237056
<b>Document Title:</b>	2022 Energy Code Pre-Rulemaking Express Terms
<b>Description:</b>	N/A
<b>Filer:</b>	Cody Goldthrite
<b>Organization:</b>	NGA and AEC
<b>Submitter Role:</b>	Public
<b>Submission Date:</b>	3/9/2021 11:35:43 AM
<b>Docketed Date:</b>	3/9/2021



BIRCH POINT  
Consulting



March 9, 2021

Docket 19-BSTD-03

2022 Energy Code Pre-Rulemaking Express Terms

Thank you for the opportunity to comment on the 2022 Pre-Rulemaking Express Terms. I represent the National Glass Association and Aluminum Extruders Council, whom together have over 1800 member companies and manufacturing across North America. We represent broad interests across the commercial and residential fenestration industry from the primary glass manufacturers, to glazing fabricators and frame extruders, to curtain wall and commercial window and door system manufacturers, window and door dealers, to the final glazing contractors and installers.

We want to thank the CASE teams and staff for all the hard work in completing the analysis and preparing the proposals that have resulted in the express term language. We appreciate the iterative dialogue we have had with the teams, and we believe the draft language and criteria are in very good shape and 95% of the way there. Other than a few corrections outlined below, we are **supportive** of the proposed fenestration changes for nonresidential buildings and in the new multifamily restructuring. In the latter, the team tackled a very difficult problem of merging everything from 2 story apartments to 20+ story highrise condos with very disparate building requirements. We support the solution the team came up with regarding fenestration, that properly accounts for both structural and safety requirements and energy efficiency goals.

The final corrections we think should be considered are:

1) Exception 1 to Section 140.3(a)5B needs to be removed:

~~EXCEPTION 1 to Section 140.3(a)5B: For school buildings less than 25,000 square feet and 3 stories or less in climate zones 1 and 16 shall have a U-factor of 0.26 or less.~~

I have no idea where this came from, but even for the colder climate zones 1 and 16, a U-factor of 0.26 is not justified. I could not find anything in the Nonresidential High Performance Envelope CASE study or any other CASE study that even analyzed this scenario or U-factor, let alone showed the cost effectiveness of such a drastic change. For comparison, the nonresidential criteria range from U-0.34 to U-0.46 for different fenestration types, the relocatable school building requirement is U-0.47, and even the Zero-Energy Advanced Energy Design Guide for K-12 School Buildings published by DOE, ASHRAE, AIA, IES, and USGBC only has U-0.34-0.36 for this region. We presume this was some sort of typo or mistake, or if not, no analysis or cost effectiveness has been shown as is required. This exception should be removed so that the main nonresidential requirements of Table 140.3-B apply.

- 2) In the new multifamily section, minimum VT requirements for class AW windows in dwelling spaces without lighting controls should not be included.

It does not make sense to include minimum VT requirements in spaces where there are no lighting controls, as there are no energy savings, and therefore no requirement can be cost justified as required for Title 24.

Specifically, in Table 170.2-A, it does not make sense to insert minimum VT requirements for class AW windows in multifamily buildings 4 stories or higher, when there is no minimum VT requirement for class AW windows in multifamily buildings 3 stories or less, or for “all other fenestration” in multifamily buildings of any height. A minimum VT for the curtain wall / window wall / storefront category makes more sense because that will mainly be in lobbies and common areas that will have daylighting controls to capture energy savings. However, for unit windows in dwelling units that have no daylighting controls, there are no energy savings associated with VT. We don’t have a major concern with the specific value; it is more that including any requirement on VT lacks a rational basis in this case and as required by law. Even the multifamily CASE report itself states on page 38:

“In multifamily spaces, modeling a variance in VT has no energy impact as there are no automated controls to interact with the space’s natural daylighting.”

We do strongly support good daylighting, but VT is only one small aspect of daylighting design. In reality, most windows being installed with modern glazing will already have high VT, but that is market-driven and best determined by the designer together with consideration of controls, geometry, shading, etc. Without a technical basis tied to cost effective energy savings,

- The minimum VT requirements should be removed from the Performance Class AW line in Table 170.2-A, to be consistent with the other unit windows.

NAFS 2017 Performance Class AW <sup>2</sup>	Maximum U-factor	0.38	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.38
	Maximum RSHGC, three or less habitable stories	NR	0.24	NR	0.24	NR	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	NR
	Maximum RSHGC, four or more habitable stories	0.35	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
	<del>Minimum VT, three or less habitable stories</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>	<del>NR</del>
	<del>Minimum VT, four or more habitable stories</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>	<del>0.37</del>

- The height provision in Exception 4 should be removed, to be consistent with how dwelling units without daylighting controls are treated in multifamily buildings of all heights.

**EXCEPTION 4 to Section 170.2(a)3iv:** Fenestration in dwelling units ~~of buildings that are three habitable stories or fewer~~ are not required to comply with the VT requirements.

- 3) For the nonresidential fenestration criteria, there is a problem with the prescriptive glazed door requirement in Table 140.3-B that is either being addressed through averaging or the performance path, or simply not being enforced. We understand the glazed door requirement of U-0.45 is already in the current code, but this number is unrealistic both currently and for the future code. (The SHGC-0.23 SHGC and VT-0.17 are not a problem.)

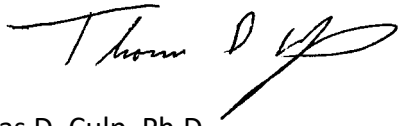
We doubt that the cost effectiveness of this U-factor was assessed when it was originally put into the code, and we do not believe it is currently being enforced, as wide-stile doors necessary for ADA compliance would require a U-factor more like 0.55. For comparison, the lowest U-factor requirement for glazed entrance doors in ASHRAE 90.1-2019 and 2021 IECC is 0.63. It is sometimes possible to achieve U-0.45 in triple glazed doors, but it is limited by the gap size and also presents challenges with weight, operating force, and safety. It is clear that triple pane glazed doors are not being widely installed in California despite the current requirement. It is possible that projects are complying by compensating for higher U-factors in the performance path, but it is more likely the problem and enforcement are just being ignored, as smaller projects such as retail use the prescriptive path. Even if it appears like an increase on paper, we suggest a U-factor of ~~0.45~~ 0.55 for glazed doors in Table 140.3-B to reflect reality and practicality, while still being significantly more stringent than ASHRAE 90.1 and IECC.

- 4) For the other nonresidential fenestration requirements in Table 140.3-B, we are not requesting a change, but want to go on record that we still have a concern that the combined SHGC and VT prescriptive criteria in Table 140.3-B will require different types of low-e glazing in fixed windows versus curtain wall, which will be aesthetically unacceptable to architects and designers. Specifically, curtain wall and window wall can use first generation triple silver low-e glass to comply with both SHGC and VT, but not the newer second generation triple silver low-e glass because of the higher minimum VT. Conversely, fixed windows can use the newer second generation triple silver low-e glass to comply with both SHGC and VT, but may not be able to use the first generation triple silver low-e glass because of the lower SHGC. As a result, the designer is stuck with an aesthetically unacceptable prescriptive requirement to have different glazing with a different appearance in the fixed windows adjacent to the curtain wall or window wall. We do agree that since area-weighted averaging is allowed by 140.3(a)5, averaging and/or the performance path can be used to come up with a uniform solution in most cases, but the commission should be aware of this potential problem for smaller projects.
- 5) Finally, from a terminology and enforcement perspective, it should be made clear that “window wall” is included under the curtain wall and storefront fenestration requirements. Window wall is a common product type and term in the industry. Window wall is differentiated from curtain wall in that it sits in-between the floor slabs versus a curtain wall which runs past the floor slab, but otherwise the appearance and size is similar. The U, SHGC, and VT performance of window wall is calculated by NFRC in the exact same manner and size as storefront. A change is not required in Table 140.3-B, but to avoid compliance issues or confusion, we suggest it be made clear in the definition and/or the appropriate reference appendices that window wall is part of the curtain wall and storefront category.

**CURTAIN WALL/STOREFRONT** is an external non-bearing wall intended to separate the exterior nonconditioned and interior conditioned spaces. It also consists of any combination of framing materials, fixed glazing, opaque glazing, operable windows, or other in-fill materials. [Window wall is also included as part of the curtain wall / storefront category.](#)

Thank you again for the opportunity to comment. We have appreciated working with the CASE teams over the last year, and believe the draft express terms and criteria are in very good shape, with just a few final small changes to be considered. Please contact me with any comments or questions.

Best regards,

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.  
Birch Point Consulting LLC  
culp@birchpointconsulting.com