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Comments on Final CASE Report - Nonresidential Fenestration

Additional submitted attachment is included below.

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July 15, 2026

David Hochschild, Chair
California Energy Commission
715 P Street
Sacramento, CA 95814

Cc: Vice Chair Siva Gunda, Commissioner Andrew McAllister, Commissioner Noemí Gallardo, and Commissioner Nancy Skinner

CEC Docket Number: 25-BSTD-03

Project Title: 2028 Energy Code Pre-Rulemaking

Subject: Comments on the Final CASE Report – Nonresidential Fenestration (2028 Title 24 Building Energy Efficiency Standards)

Dear Chair Hochschild and Commissioners:

On behalf of the 350 member companies of the Fenestration & Glazing Industry Alliance (FGIA), who manufacture curtainwalls and storefront systems, windows, doors, skylights, and the glazing and other components that go into them for commercial and residential construction, we appreciate the opportunity to provide stakeholder feedback to the California Energy Commission (Commission) on the Final Codes and Standards Enhancement (CASE) Report for the proposed Nonresidential Fenestration measure, as part of the 2028 update to Title 24 Building Energy Efficiency Standards. We also appreciate the continued engagement of the CASE Team through this process.

FGIA respects the decision to not incorporate into the final CASE report our recommendation to align U-factor values with the 2027 International Energy Conservation Code (IECC) values. Although we continue to believe that such alignment would be beneficial, the values proposed in the Final CASE report for both the new construction and alterations tables appear reasonable and achievable. Our remaining concerns relate to certain language proposed for the alteration provisions. We seek clarification and offer several suggestions to prevent misinterpretation by code users, including manufacturers that must provide compliant products, design professionals and contractors who need a clear understanding of what the requirements entail, and code officials responsible for enforcement.

Specifically, for proposed section 301.5.2.2.2.1; FGIA recommends the following edits to align this provision with existing definitions in the California Energy Code (the Code):

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> **301.5.2.2.2.1.** *Vertical fenestration* or *glazed door alterations* replacing one hundred percent of any single *fenestration* type (fixed or operable *windows, curtain wall/storefront*~~, *curtainwall, glazed doors*~~*)* shall meet the requirements of Sections 301.3.4.2 through 301.3.4.4 *[Sections140.3(a)5B through 140.3(a)5D].*

The Code defines *vertical fenestration* as excluding doors and separately defines *glazed door*. In addition, the Code uses the term "*curtain wall/storefront*". The suggested change to add "fixed or operable" aligns with the terminology used in both the proposed alteration table as well the existing new construction tables. Those relevant Code definitions are reproduced below:

> 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. Note: Window wall is also included as part of the curtain wall/storefront fenestration category.
>
> FENESTRATION PRODUCT is any transparent or translucent material plus any sash, frame, mullions and dividers, in the facade of a building, including, but not limited to, windows, glazed doors, skylights, curtain walls, dynamic glazing, garden windows, glass block, and glazing used in greenhouses.
>
> GLAZED DOOR is an exterior door having a glazed area of 25 percent or greater of the area of the door. Glazed doors shall meet fenestration product requirements. See "door."
>
> VERTICAL FENESTRATION is all fenestration other than skylights and doors.

In addition, FGIA members are concerned that portions of the proposed alteration language may conflict with existing Code provisions. The following screenshots illustrate the relevant language.

Current Code language:

E. **Exterior windows.** Fenestration alterations other than repairs shall meet the following requirements:

1. **Vertical fenestration alterations.** Where over 150 square feet of the entire building's vertical fenestration is replaced, the maximum *U*-factor of the replaced units shall not exceed U-0.58.
2. **Added vertical fenestration.** Where over 50 square feet of vertical fenestration is added, it shall meet the requirements of Section 120.7(d). Where 50 square feet or less of vertical fenestration is added, this requirement shall not apply.

SECTION 141.0 – ADDITIONS, ALTERATIONS, AND REPAIRS TO EXISTING NONRESIDENTIAL, AND HOTEL/MOTEL BUILDINGS, TO EXISTING OUTDOOR LIGHTING, AND TO INTERNALLY AND EXTERNALLY ILLUMINATED SIGNS

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2. **Prescriptive approach.** The altered components of the envelope, or space conditioning, lighting, electrical power distribution and water heating systems, and any newly installed equipment serving the alteration, shall meet the applicable requirements of Sections 110.0 through 110.9, Sections 120.0 through 120.6, and Sections 120.9 through 130.5.

   Exception to Section 141.0(b)2: The requirements of Section 120.2(i) shall not apply to alterations of space-conditioning systems or components.

   A. Fenestration alterations other than repair and those subject to Section 141.0(b)2 shall meet the requirements below:

      i. Vertical fenestration alterations shall meet the requirements in Table 141.0-A.

      ii. Added vertical fenestration shall meet the requirements of TABLE 140.3-B, C, or D.

      iii. All altered or newly installed skylights shall meet the requirements of TABLE 140.3-B, C or D.

      Exception 1 to Section 141.0(b)2Ai: In an alteration, where 150 square feet or less of the entire building's vertical fenestration is replaced, RSHGC and VT requirements of TABLE 141.0-A shall not apply.

      Exception 2 to Section 141.0(b)2Aii: In an alteration, where 50 square feet or less of vertical fenestration is added, RSHGC and VT requirements of TABLE 140.3-B, C or D shall not apply.

      Exception 3 to Section 141.0(b)2Aiii: In an alteration, where 50 square feet or less of skylight is added, SHGC and VT requirements of TABLE 140.3-B, C or D shall not apply.

   NOTE: Glass replaced in an existing sash and frame, or sashes replaced in an existing frame are considered repairs. In these cases, Section 141.0(c) requires that the replacement be at least equivalent to the original in performance.

Table 141.0-A Altered Vertical Fenestration Maximum U-Factor and Maximum RSHGC

Requirement	**CZ 1**	**CZ 2**	**CZ 3**	**CZ 4**	**CZ 5**	**CZ 6**	**CZ 7**	**CZ 8**	**CZ 9**	**CZ 10**	**CZ 11**	**CZ 12**	**CZ 13**	**CZ 14**	**CZ 15**	**CZ 16**
U-factor	0.47	0.47	0.58	0.47	0.58	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
RSHGC	0.41	0.31	0.41	0.31	0.41	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.41

NOTE: The required values for VT are located in Tables 140.3-B, C, and D for all Climate Zones.

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Final CASE Report proposal:

301.5.2.2.2 *[New Section]*. Nonresidential Vertical Fenestration. For *nonresidential buildings* not including hotel/motel buildings and nonresidential buildings with California Building Code Group R Occupancies and their common or public use areas, *vertical fenestration alterations* other than *repairs* shall meet the following requirements:

301.5.2.2.2.1. *Vertical fenestration alterations* replacing one hundred percent of any single *fenestration* type *(windows, storefront, curtainwall, glazed doors)* shall meet the requirements of Sections 301.3.4.2 through 301.3.4.4 *[Sections 140.3(a)5B through 140.3(a)5D]*.

301.5.2.2.2.2 All other *vertical fenestration alterations* shall meet the requirements in Table 301.5-A.2 *[New Table]*.

Exception to Section 301.5.2.2.2.2: In an *alteration*, where 150 square feet or less of the *entire building's vertical fenestration* is replaced, *RSHGC* and *VT* requirements of Table 301.5-A.2 *[New Table]* shall not apply.

301.5.2.2.2.3. Added *vertical fenestration* shall meet the requirements of Table 301.3-C.3 *[New Table]* in Section 301.3.9.

Exception to Section 301.5.2.2.2.3: In an *alteration*, where 50 square feet or less of *vertical fenestration* is added, *RSHGC* and *VT* requirements of Table 301.3-C.3 *[New Table]* shall not apply.

301.5.2.2.2.4. All altered or newly installed *skylights* shall meet the requirements of Table 301.3-C.2, D or E in Section 301.3.9 *[Table 140.3-B, C or D]* **Exception to Section 301.5.2.2.2.4:** In an *alteration*, where 50 square feet or less of *skylight* is added, *SHGC* and *VT* requirements of Table 301.3-C.2, D or E in Section 301.3.9 *[Table 140.3-B, C or D]* shall not apply.

NOTE: Glass replaced in an existing sash and frame, or sashes replaced in an existing frame are considered *repairs*. In these cases, Section 100.4.4.1 *[Section 141.0(c)]* requires that the replacement be at least equivalent to the original in performance.

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FGIA members are uncertain how the proposed revisions are intended to interact with the existing Code language shown above. This uncertainty is likely to make the requirements more difficult to interpret, apply, and enforce. FGIA therefore strongly encourages the Commission to ensure that the proposed language is fully aligned with existing Code and clearly explains how the requirements apply. Our objective is to provide manufacturers, design professionals, contractors, and enforcement officials with clear and consistent requirements. We appreciate the CASE Team's continued engagement and welcome the opportunity to work collaboratively with the Commission to advance California's energy goals.

Sincerely,

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