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on the draft CASE report for Multifamily Restructuring

Additional submitted attachment is included below.

BIRCH POINT Consulting

ALUMINUM EXTRUDERS COUNCIL

NGA NATIONAL GLASS ASSOCIATION with GANA

October 27, 2020

Docket 19-BSTD-03
2022 Energy Code Multifamily Domestic Hot Water Boilers and Restructuring draft CASE report

Thank you for the opportunity to comment on the draft Multifamily Restructuring CASE report, specifically on the proposed fenestration requirements. I represent the National Glass Association and the 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.

I am also co-vice-chair of the ASHRAE 90.1 committee. While I do not speak for the ASHRAE 90.1 committee here, I can provide information on how the proposed changes relate to the latest edition of ASHRAE 90.1-2019.

First, I would like to thank the CASE team for their hard work, and for the dialogue that we have had about the issues and implications of the possible restructuring to cover all multifamily under its own code. In addition to the prior comments I have provided as part of our dialogue, below are additional comments on both areas of support and concern regarding the proposed combined fenestration requirements.

To start, we support the proposed curtain wall and storefront requirements, which are reasonable and cost effective. They also align reasonably well with the requirements of ASHRAE 90.1-2019 and the 2021 IECC. Most of California lies in what would be their zones 3-5, where the U-factors are 0.42, 0.36, 0.36, respectively. We do want to make a note on terminology: both the current and proposed Title 24 code addresses curtain wall and storefront fenestration terms, but is silent on “window wall” which 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 run past the floor slab. There are subtle differences in NFRC thermal simulations between the two products, but otherwise the appearance and size are similar. The U, SHGC, and VT performance of window wall is calculated by NFRC in the exact same manner and size as storefront. To avoid compliance issues or confusion, we suggest it be made clear in the reference appendices and manual that window wall is part of the curtain wall and storefront category.

We also agree with how the team has decided to merge the residential and nonresidential codes in treating fenestration shading using RSHGC, as well as how fenestration area is treated. We believe it is a little overbearing to apply *both* the window-to-floor ratio and window-to-wall ratio, but I agree that it likely has little impact for these specific types of multifamily buildings.

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Our main concern is with the "all other fenestration" requirements, which would cover fixed and operable unit windows. As the team is aware, design requirements and construction of a 2 story apartment and a 20 story highrise condominium building are very different. For fenestration, not only do windload and seismic considerations lead to different structural requirements, but architectural expectations regarding durability, installation, water management, air infiltration, and sightline aesthetics are different. Furthermore, the report often talks about differences starting at 8-9 stories, but we want to point out that structural demands depend on the specific building and specific opening – for example, large spans can require more structural framing even at low heights. The main point is that if the code is to be merged, ***the code must account for both structural requirements and energy efficiency goals, and certainly not jeopardize safety.***

Including the curtain wall and storefront criteria is certainly an important aspect of this. However, it is equally important to account for unit windows, where windows commonly used in lowrise and highrise applications are significantly different in design and performance. The draft CASE report suggests using the lowrise residential U-factor of 0.30, which bluntly, is not appropriate for commercial-style windows needed for higher structural and durability performance. This is not solely about frame material … to have good energy efficiency performance along with high structural performance, aluminum framing incorporates nonmetal thermal break technology; conversely, to improve structural performance, vinyl and fiberglass framing incorporates metal reinforcement. In the end, both could be considered composite systems, and the proposed requirements must be realistic and cost effective for products that are applicable for use in highrise buildings regardless of material. However, that is not currently the case with the proposed U-0.30.

One significant concern is that, as the report directly states, this proposed U-0.30 requirement is <u>not</u> cost effective.

> "The proposed code change for new construction is **not cost effective** on its own and is cost-effective when packaged with the all-electric HVAC submeasure in every climate zone for which the change is proposed." P. 179 [emphasis added]
>
> "Submeasures C and D are **not cost-effective** as standalone measures." P. 183 [emphasis added]

Even if the overall all-electric package is cost-effective, that will not be used in every building, and is insufficient to justify individual measures that are not cost effective.

This then presents two options to the team. The first option is to raise the U-factor to something higher than 0.30 that accommodates structural products and is cost effective in all building types. However, this does then present an issue for lowrise multifamily buildings three stories and less, where the current requirement is U-0.30. The second option is to keep the U-0.30 that is appropriate for lowrise construction, but specifically include another requirement appropriate for when structural windows are used. The easiest way to do this is to have a U-factor for AW-class architectural windows certified in accordance with the North American Fenestration Standard (NAFS, or AAMA/WDMA/CSA 101/IS2/A440). As previously discussed, fenestration in the AW class is the highest of four levels with very stringent tests for air, water, and structural performance. These are specifically built for structural applications, which would include large span openings and highrise, and would be appropriate for differentiating these products in this code. In fact, Washington State has gone with this approach, and is including U-factor requirements for AW windows and curtain wall separate from other windows.

We believe this is an appropriate solution to this issue, and would support the proposal if a line is added in the prescriptive tables with separate U-factor requirements for "AW class fenestration certified in accordance with AAMA/CSA101/I.S.2/A440" or simply "AW class fenestration" with a footnote indicating that it is certified in accordance with AAMA/CSA101/I.S.2/A440.

As for the U-factor, we would support an **overall average of 0.38 for AW windows**, knowing that the team is suggesting using one area-weighted average rather than separate U-factors for fixed and operable products. This would correspond to 60% of fixed at U-0.34 and 40% of operable at U-0.44. These values are achievable and generally cost effective, while still promoting strong energy efficiency. For comparison, ASHRAE 90.1-2019 and the 2021 IECC have U-0.34-0.36 for fixed windows and U-0.42-0.45 for operable windows in their climate zones 4-6. Washington State will be using U-0.38 for AW fixed windows and U-0.40 for AW operable windows. Also, the nonresidential CASE team is proposing U-0.34-0.36 for fixed windows and U-0.46 for operable windows in the nonresidential part of Title 24. Finally, while not a code, the New Buildings Institute's Multifamily Guide uses U-0.34-0.36 for fixed windows and U-0.41-0.43 for operable windows in their climate zones 4-6. Therefore, an overall average U-0.38 would be reasonably consistent with other codes and standards, and actually more efficient than those codes in coastal and central California (their climate zone 3).

Including AW windows will also provide other benefits in terms of durability, where AW windows must maintain air infiltration and water resistance performance after additional testing of thermal cycling, operating cycling, use and abuse loads that other window classes are not subjected too.

The report says the team decided to not include separate requirements for AW products because there are already double glazed AW windows on the market that meet the U-0.30 criteria, and the team provided names of some specific manufacturers and products. That is not exactly true. Those manufacturers are members of our associations, and they have confirmed that the operable products listed will not hit U-0.30 without going to triple glazing. Some of the fixed products can get there with a 4th surface low-e along with other energy features, whereas others will still require triple glazing, but that is only for fixed windows and at increased cost. We understand the team is considering a 60/40% mixture of fixed and operable windows, but U-0.30 is still not broadly applicable for structural products, and also not cost effective – as the report already notes. A separate requirement for AW class fenestration is warranted and necessary.

Some concerns were raised about adding the reference to AW class fenestration in regard to potential challenges of compliance, enforcement, and education. We understand that additional education may be required. We will help in any way we can, and also note that additional education will also have the benefit of improving compliance with all aspects of the fenestration requirements, not just about AW windows. Also, the building code *already* requires the design pressures to be determined in accordance with the same AAMA/WDMA/CSA 101/IS2/A440 standard, so there should already be familiarity with it in the enforcement community. The code should also refer to the specific year version of the standard (AAMA/WDMA/CSA 101/IS2/A440-2017) to avoid any concerns about the standard changing outside the California code cycle. Finally, some comments were made that a building owner might put in AW windows where they are not needed, in order to use the higher U-factor. That

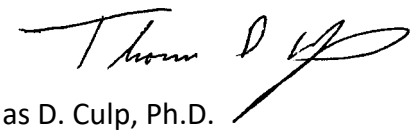
is not a realistic concern – an architectural grade AW window will be hugely more expensive than lighter residential-style windows, and it would be a very poor financial decision for a developer. The architect specifies them where they are needed and the extra cost is justified. There would be no loophole anyway, because they would not gain any extra 'margin' in comparison to the requirement, as it would still be very stringent for AW windows. In summary, we see no serious reasons to avoid use of AW windows, and instead see the benefit and necessity of including it to advance the code.

On another topic, I noticed an error regarding chromogenic glazing that occurred when merging the code language. In Exception 2 to Section 170.2(a)3Aii, item a. should read "The lower-rated labeled U-factor and RSHGC and higher-rated labeled VT shall be used with …", not "The lower-rated labeled U-factor, ~~and~~ RSHGC, and VT shall be used with …". You can confirm this in the existing language in Exception 3 to Section 140.3(a)5D.

Also, I believe SHGC needs to be changed to RSHGC in Table 170.2-A.

Thank you again for the opportunity to comment. Please contact me with any questions, and I look forward to our continued dialogue.

Best regards,



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