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Via Electronic Mail

Jackalyne Pfannenstiel, Chair
California Energy Commission
Attention: Docket No. 07-BSTD-1
Dockets Office
1516 Ninth Street, MS-4
Sacramento, CA 95814

Re: Docket No. 07-BSTD-1

Dear Chair Pfannenstiel and Commissioners:

Cardinal Glass Industries submits the following comments on the 45-day language for the Building Energy Efficiency Standards:

Introduction

Cardinal Glass Industries is the largest manufacturer of insulating glass and low-e glass for use in windows the United States and is an active supporter of energy efficiency. We have 27 manufacturing facilities across the nation, including two in California, and over 5,000 employees. Cardinal Glass Industries supports the efforts of the California Energy Commission to continue to improve the energy efficiency embodied in the Building Energy Efficiency Standards and provide national leadership in energy efficient buildings. Cardinal has been an active participant in the development of energy codes nationwide for many years, and we appreciate the opportunity to participate in this process.

Cardinal Glass Industries generally supports the 45-day language as a solid starting place and opposes any modifications to weaken the progress that has already been made. However, given our expertise in fenestration-related code issues on a national basis, we have several recommendations for adjustments either now or in the near future that will maintain California's national leadership in state energy codes.

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We have identified four fenestration-related areas in the Standards where a few adjustments in the short term could have a major long-term impact on California's energy efficiency. Our recommendations and reasons are set forth below:

- 1. Section 10-112; Tables 116-A and 116-B: Maintain reference to NFRC rating procedure in establishing fenestration default tables and consider establishing criteria that will ensure that values are set that will not encourage builders to use un-rated products.**

California has led the nation in the development of robust fenestration energy ratings through the National Fenestration Rating Council, including participating on the NFRC Board for many years. The state should not send inconsistent signals by permitting default fenestration values that could give builders an incentive to bypass the rigorous testing and simulation criteria established by NFRC. As a result, at a minimum, in this cycle, we would strongly recommend against eliminating the reference in section 10-112 to the NFRC procedure as proposed. Moreover, we recommend that the Commission consider approaches to strengthen the criteria in this section to ensure that no default value is as good as a rated value.

Unfortunately, section 10-112 of the 45-Day Language eliminates the requirement that default fenestration values be based on the NFRC rating procedure, and instead substitutes *ASHRAE 2005 Handbook of Fundamentals*. We have no objection to referencing the *ASHRAE Handbook* along with NFRC. However, if the default values in Table 116-A are determined without reference to NFRC's rigorous testing and simulation requirements, as well as ASHRAE, there is a possibility that glazing evaluated under the default table will receive lower U-factors or SHGC values than they would have under NFRC's criteria. This will create an incentive for builders to use unverified fenestration products – products which in reality may not meet the default criteria.

Similarly, we believe that a window default table should assume that a window is less efficient if not tested under recognized methods. If the default table assumes higher U-factors and SHGC values, and creates a disincentive for builders to use untested products, builders will be more likely to install high-quality tested fenestration products in homes. We would recommend that, in the future, the default criteria in section 10-112, specify that defaults be set so that no product would obtain a better U-factor or SHGC under the defaults than under an NFRC rating. One approach to achieve this might be to increase default values from the Handbook or NFRC values (whichever is higher) by 10% to decrease the likelihood that such defaults would be equal to or lower than rated values. This concern is especially applicable to the too generous default approach developed for certain site-built non-residential fenestration under Appendix NA6, which is discussed below.



2. Section 116(a): Eliminate special window rating exceptions for nonresidential buildings with less than 10,000 square feet of site-built fenestration.

Proper testing and labeling of fenestration is important regardless of the size of a building. Section 116(a) requires all fenestration products to meet reasonable certification requirements, including NFRC ratings for U-factor and SHGC values. However, this section also allows a significant exception for both U-factor and SHGC for non-residential buildings with less than 10,000 square feet of site-built fenestration or skylights by allowing a far more generous default approach under Appendix NA6, instead of using the standard defaults in Tables 116-A and 116-B. We recommend that these exceptions be eliminated or at least narrowed. There is no good reason why a moderately large non-residential building with so much glazing area should not get its windows reliably rated. As we pointed out in our comment above, without a default table properly designed to ensure that no default product gets a better rating than it would if tested, a default approach is simply an invitation to use untested products. Continuing the 10,000 square foot exception is unnecessary and will likely negatively affect building energy efficiency.

We have heard the arguments that the NFRC rating procedure for commercial site-built fenestration is insufficient as presently available. We do not agree. While there is no doubt the procedure, like everything else in life, can be improved, it certainly works now, since it is already effectively required in California for buildings with glazing in excess of 10,000 feet. The same arguments were made last year to the International Code Council as to the national model energy code, *International Energy Conservation Code* (the "IECC") (which does not have this exception), and were roundly rejected. We view the problem as more of a "chicken or egg, which came first?" problem. Without sufficient demand for the ratings due to such a broad exception, the rating process will never become sufficiently embedded such that the industry will use it. California faced the same issues with NFRC on the residential side a decade ago and solved the problem by effectively requiring NFRC ratings; once window manufacturers saw that ratings were inevitable, they adapted to the program. Moreover, we are concerned that with such a broad exception, users may be relying on the exception, even where the exception does not apply – such as with manufactured commercial windows or windows in buildings with more than 10,000 square feet of glazing.

In short, we would eliminate the additional default exception. If such an action is deemed too drastic at this time, then, at a minimum, we would suggest that the 10,000 square foot limit be reduced to 5,000 square feet with the intent to eliminate the special exception in its entirety in the next cycle. If these issues cannot be addressed in the current cycle, we strongly recommend that the Commission fix this entire problem in the next cycle.



3. Table 143-A: California's prescriptive fenestration criteria for nonresidential buildings (and performance baseline) could be more aggressive and ideally should be at least as stringent as the IECC's fenestration requirements in all cases.

The prescriptive fenestration criteria established in Table 143-A could be further improved. Both the U-factors and SHGCs could reasonably be set at lower levels. In addition, we recommend that the distinction between glass and plastic skylights be eliminated and only one set of values for all skylights be established. (We also recommend reviewing Table 143-B with these same considerations in mind.)

We support California's use of a single U-factor for all window types because it adds simplicity and clarity for builders and code officials. However, the U-factor requirements in Table 143-A are, in many cases, less stringent than those set in the *IECC*. For example, the *IECC* assigns most of California to climate zones 3-5, where the U-factor ranges between 0.35 and 0.65 for windows with non-metal frames (the *IECC* allows higher U-factors with metal frames, but we do not recommend this approach). By contrast, the proposed Table 143-A allows higher U-factors of 0.47 to 0.77 across the state. A lower U-factor will translate into better energy efficiency and more comfortable buildings. For purposes of comparison, the proposed residential window U-factor is set much lower, at 0.40 across the state.

Similarly, as is proposed with U-factor, we think the SHGC should be set at a single value for each climate zone and values dependent on window-to-wall ratios should be eliminated. The *IECC* has adopted this approach, setting the SHGC requirement at 0.25 to 0.40 (depending on climate zone), regardless of the window-to-wall ratio (up to 40%). Table 143-A allows higher SHGC values – between 0.31 and 0.72 – even in buildings with 30-40% window-to-wall ratio. For cooling-dominated climates, solar heat gain reductions translate into lower energy costs, lower peak demands on the electric grid and more comfortable buildings. Low-SHGC products are widely available in California, so the cost impact (if any) would be minimal.

Finally, the proposed table requires different U-factors and SHGC values for skylights made of different materials. This differentiation was eliminated in the *IECC* in the most recent edition, so that all skylights must meet the same requirement, regardless of composition. If a builder wishes to install a skylight that does not meet these requirements, the builder can always trade-off efficiency in skylights for an enhancement elsewhere in the building envelope. We recommend that the different requirements for glass and plastic skylights be eliminated in California and that one set of requirements be established for both.



- 4. Table 151-C, Component Package D: California's prescriptive fenestration criteria for residential buildings (and performance baseline) could still be improved with more aggressive fenestration U-factor and SHGC values and ideally should be at least as stringent as the IECC's fenestration requirements in all cases.**

We support the Commission's proposal to lower residential fenestration U-factors statewide to 0.40 and to require a 0.40 SHGC in most climate zones in Table 151-C (and a 0.35 SHGC in at least one climate zone). While these targets are more aggressive than previous targets, there is still more room for increased stringency in the values for residential fenestration in some or all of the climate zones. On the positive side, the proposed new California state-wide value of 0.40 is well below the existing IECC value for most of the state of 0.65 and there is a proposal before the IECC in this cycle to lower this 0.65 to 0.40 consistent with California. On the other hand, the current residential U-factor requirement in the IECC is as low as 0.35 in the northern part of California. We believe that a 0.35 U-Factor could be achieved statewide without substantial additional cost to builders in California. Windows sold in California that meet the 0.40 U-factor would likely meet a 0.35 target too (our experience suggests that the majority of residential windows sold nationwide likely meet a 0.35).

Similarly, on SHGC, while the existing 0.40 SHGC across much of California generally matches up to the IECC requirements, we see signs that this value will go lower in the near future. The *2007 Supplement to the IECC* requires an SHGC of 0.37 in certain cooling climates, while several proposals currently before the ICC would lower the allowable SHGC to 0.35, or 0.30, or even 0.25, across most cooling climates. These values could be reached with little or no cost difference, and many fenestration products on the market already meet these requirements. As a result, the Commission should consider these as potential improvements in either this cycle or future cycles

Conclusion

We see significant improvements in this round of changes to the California energy code. That said, as discussed above, there are additional substantial improvements in the fenestration area that we believe should be considered now or in the near future.

Respectfully Submitted,


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