

DOCKET

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**Before the California Energy Commission
Docket No. 10-BSTD-01
2013 Building Energy Efficiency Standards**

Comments of Cardinal Glass Industries on Residential Fenestration Requirements in the Staff Proposed Draft Standards Discussed at the October 14, 2011 Workshop

Cardinal Glass Industries* submits the following comments on the residential fenestration requirements in the Staff Proposed Draft 2013 Building Energy Efficiency Standards. Cardinal has participated in multiple Staff workshops for the 2013 Rulemaking, through WebEx and in person at the October 13 – 14, 2011 Staff Workshops. These written comments follow-up on the remarks we have made previously, both in writing and at the workshops, on two residential fenestration topics: (a) proposed residential Prescriptive Component Package A; and (b) proposed Mandatory Requirements for residential windows.

Cardinal Supports the Proposed Fenestration Prescriptive Path Values

Cardinal submitted written comments on August 5, 2011 and has testified at multiple workshops in support of the residential window requirements that are included in the Staff Proposed Draft Standards. We firmly believe that the analysis presented during the workshops, as well as our own considerable experience, demonstrates that the proposed new targets – a 0.32 maximum U-factor and 0.25 maximum SHGC for most of the state – are cost-effective and will generate substantial additional energy and peak demand savings for California in the future. The proposed prescriptive values are equal to, or better than, the requirements of the recently published newest edition of the national residential model energy code, the 2012 International Energy Conservation Code (IECC), and are the proper next step to carry the state until its subsequent Standards update in 2017.

From the beginning of the 2013 Rulemaking process, Cardinal has supported, and continues to fully support, the proposed residential prescriptive path values. We have offered one suggestion, discussed in more detail later, that the Commission retain an

* Cardinal Glass is the national leader in manufacturing high performance low-E coatings and insulating glass units used in fenestration. Cardinal is a management-owned corporation headquartered in Minnesota with 5,500 employees and 27 manufacturing facilities nationwide. Cardinal has two facilities in California that produce the type of coated glass products currently required by California Standards, as well as products that would meet the new standards proposed during the Staff Workshop. Cardinal also has facilities that produce float glass, tempered glass and insulating glass units on the West Coast. Over the past two decades, we have actively participated during California's standards updates and have participated nationally in the model code development process.

SHGC prescriptive maximum (preferably 0.25 consistent with other climate zones, or at least 0.40) in climate zone 5. We have also offered limited suggestions on mandatory measures for the Commission to consider as enhancements to the effectiveness of the performance path compliance method pertaining to fenestration. We are submitting these written comments to supplement our prior comments and testimony. Please note that we have consistently focused our commentary on vertical residential fenestration only and do not address skylights.

In our August 5, 2011 written comments, we included significant data and supporting reasons for setting baseline window U-factor and SHGC criteria that encourage the use of high performing low solar low-E glazing, which is both cost-effective and widely available. We intend these comments to be cumulative to our August 5th comments and therefore have not repeated that information here, but instead incorporate our August comments by reference.

Aside from our solid support for the proposals, we have commented both in writing and during the October 14th Workshop that there are two specific opportunities to further improve the low-rise residential Standards:

1. Lower the maximum U-factor proposed in Draft Standards Section 150.0(q) from the proposed 0.57; we suggest a mandatory maximum 0.40 U-factor, or at least a 0.48 U-factor to match the IECC.
2. Include in the Mandatory Requirements for windows a maximum SHGC; we suggest a mandatory maximum 0.40 SHGC, or at least a 0.50 SHGC to match the IECC.
 - Passive Solar Exception: if additional flexibility for passive solar designs is desired, south-facing orientations (ideally with suitable overhangs) could be specifically excluded from the Mandatory SHGC Requirements for windows.

Extra Low Solar Gain Low-E (ELSLE) Is Widely Available

We have reviewed a few comments filed in the BSTD Docket Log and witnessed some discussion during the July 15th and October 14th workshops questioning whether low solar gain low-E glazing meeting a 0.25 SHGC or better is available in California. (The CASE authors have defined this type of low-E as “Extra Low Solar Low-E” or “ELSLE”.) From the discussions we have observed, it appears that sufficient data has been presented both in comments and at the workshops to dispel the misinformation that Extra Low-Solar Low-E glazing is “proprietary” or not readily available to window manufacturers. It has been shown by us and others that the lack of availability claims

simply are untrue. Multiple workshop participants have correctly pointed out that Extra Low Solar Low-E glass is available to all window manufacturers from most of the major U.S. glass manufacturers (including Cardinal, which currently produces this product in its California facilities). ELSLE is currently available from manufacturers and supply outlets in California in a wide array of window products, including the most challenging frame types. These products continue to provide substantial visible light while providing the energy, peak demand and comfort benefits of very low solar gain (blocking 75% of the solar gain). We provided examples of such products in our August 5th written comments.

We have also noted in our comments and during the workshops, but it bears repeating, that as early as 2009, 51% of the millions of window products listed in the NFRC Certified Products Directory had SHGCs of 0.25 or better. Product research also shows that conforming windows are already sold in California from numerous window manufacturers. Moreover, our experience tells us that because these types of products are currently readily available in California, adoption of the proposed new Standards will only increase the availability of these products.

Cardinal Supports Reasonable Mandatory Fenestration Requirements

Cardinal has testified in favor of mandatory fenestration maximums during the workshops, and we included detailed reasons for these maximums in our August 5th written comments. We have also participated for years in the IECC code development process to adopt and improve its fenestration mandatory maximums. As we have previously explained, because of the peak demand, sizing and comfort justifications for setting fenestration maximums, the IECC has included a mandatory maximum U-factor and SHGC since its 2004 version. We fully support the establishment of a mandatory fenestration U-factor requirement in the Staff Proposed Draft Standards, Section 150.0(q). However, we think the proposed 0.57 U-factor should be much lower to make it more effective and beneficial to occupants. The proposed 0.57 U-factor window is capable of being met by most average double-pane clear glass units. Because much of the California market has already transformed to double-pane products, and most with low-E glazing, the proposed 0.57 mandatory maximum U-factor will have little meaning in practice, and we recommend lowering the value as a backstop.

We also recommend instituting a mandatory SHGC requirement, which seems to have been excluded due to concerns over passive solar design. We think it is perfectly acceptable and a logical next step for the Standards to mandate some form of low-E glass across the state by establishing meaningful mandatory maximums. It was apparent at the October 14th workshop that many stakeholders saw the clear value and benefit in establishing a mandatory maximum SHGC. At the same time, we

acknowledge that a few stakeholders commented it was important to protect the ability to build passive solar designs. There was discussion during the workshop about establishing a mandatory maximum SHGC in conjunction with a workable passive solar design exception. We propose that exempting south-oriented glazing from the mandatory maximum SHGC requirement is the simplest approach. If this is done in conjunction with the allowable area-weighted averaging from the other orientations, there should be no hindrance to passive solar designs. Moreover, if meaningful maximum U-factors and SHGCs are enacted, occupants of passive solar design will have the benefit of low-E windows on the non-south orientations.

We have proposed that a 0.40 maximum U-factor and a 0.40 maximum SHGC are the appropriate meaningful maximums. The current prescriptive path baselines in the 2008 "Package D" for most of California are a 0.40 U-factor and 0.40 SHGC. Setting maximums of a 0.40 U-factor and 0.40 SHGC would be a natural progression from the current Standards. Additionally, our maximum "0.40/0.40" proposal would establish reasonable upper limit spreads from the Staff Proposed Draft 2013 Standards "Package A" prescriptive values that are well below the 0.40 U-factor/0.40 SHGC maximums. As we have previously commented, these values would prevent any backsliding from the low-E market penetration already achieved in California and ensure the comfort and condensation benefits we described in our August 5th written comments are not traded away.

Our 0.40/0.40 recommendation would be easily accomplished by amending Section 150.0(q) as follows:

"(q) Fenestration Products separating conditioned space from unconditioned space shall meet the requirements of either Item 1 or 2 below:

1. Fenestration products must have a maximum U-factor of 0.4057 and, where Table 150.1-C requires SHGC, a maximum SHGC of 0.40.
2. The weighted average U-factor and SHGC of all fenestration products shall not exceed the U-factor and SHGC that would result from installing 0.4057 U-factor and 0.40 SHGC fenestration products throughout the conditioned space of the building.

EXCEPTION 1 to Section 150.0(q)1: Up to eight square feet of fenestration area.

EXCEPTION 2 to Section 150.0(q)1: south facing fenestration shall be exempt from the maximum SHGC requirement of Section 150.0(q)1 provided the south facing fenestration is covered by a permanent overhang extending no less than twenty-four inches beyond the face of the fenestration.”

In the event our proposed 0.40/0.40 maximums and passive solar exception are unacceptable, we urge Staff to at least match the IECC’s maximum 0.48 U-factor and maximum 0.50 SHGC. Taken together, these mandatory maximums require at least some form of low-E for all of California, which would be an improvement over the 0.57 U-factor in the proposed Draft Standards. We see no reason why California should continue to allow the use of excess amounts of clear glass in homes, even in passive solar designs, which could benefit from lower U-factors (and SHGCs on the appropriate orientations).

Response to Docket/Workshop Comments

Our August 5th written comments replied to various comments that were submitted in the Rulemaking Docket and voiced during the prior workshops. We believe our prior comments have adequately addressed the issues that were raised in the Docket, and we have not restated our rebuttal points here. We think it is important to note that we observed very little opposition at the October 14th Workshop to the proposed residential fenestration Draft Standards. We believe Staff has done a commendable job crafting and supporting the prescriptive fenestration provisions to be a significant improvement in the Standards.

Also in our August 5th comments, we pointed out an aberration with regard to Climate Zone 5 when comparing the 2008 Standards to the current proposal. Except for CZ5, the proposal has strengthened the SHGC baseline values that existed in the 2008 Standards in every California climate zone and even added a max 0.25 SHGC in CZ16 where no maximum previously existed. We understand that the weather data utilized by the CASE authors has been updated since the 2008 Standards were developed, which appears to be the reason for the particular change we observed in CZ5. In our comments, we asked Staff to reconsider eliminating the maximum SHGC requirement from CZ5. We suggested instituting the 0.25 SHGC in CZ5, which would be consistent with most of the state. Alternatively, we suggested that Staff simply reinstate the 0.40 SHGC from the 2008 Standards, which would be a seamless transition to the new Standards. There are clear peak demand saving benefits and cost savings from smaller HVAC sizing that have occurred in this zone as a result of the 2008 Standards. We think it would be a step backward for the Standards to eliminate SHGC from a climate zone

where it was previously required. We once again ask Staff to consider a 0.25 maximum SHGC in CZ5, or at least reinstate the 0.40 max SHGC from the 2008 Standards.

Conclusion

In summary, Cardinal fully supports the Staff Proposed Draft Title 24 Building Energy Efficiency Standards as they pertain to residential fenestration. These changes will improve the Standards to be equal to or better than the 2012 IECC, a key benchmark. Additionally, we recommend careful consideration of the limited enhancements we have recommended above. We thank you for the opportunity to provide these comments.

Respectfully submitted,



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On Behalf of Cardinal Glass Industries

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