

February 11, 2016

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Dear Doug and Brian:

AGC Glass Company North America (“AGC”) submits the following comments to the Energy Star (“Energy Star”) Specification Framework Document (“Framework Document”) for Exterior and Interior Storm Panels (“Low-e Storm Panels”).

For the reasons set out below, AGC supports implementation of the Energy Star Framework Document as soon as reasonably possible.

I. Low-e Storm Panels Meet All Energy Star Guidelines

All of the Energy Star guidelines for the development of a specification for a new product category, namely, Low-e Storm Panels, are met.

1. Significant National Energy Savings Can be Achieved

There can be no real doubt that significant energy savings can be realized on a national basis through the Energy Star labeling of Low-e Storm Panels.

Single pane, clear glass windows were the norm until the 1970’s and 1980’s. After that, in northern climates, double glazed clear glass units became popular, principally, to eliminate the ice that often formed on the inside of single pane windows in cold climates. The development of low-e coatings began in the 1970’s but did not become commercially available on windows until the mid-1980’s.¹ Even then, low-e coated windows did not gain significant traction in the marketplace until the 1990’s and did not start to find their way into mandatory energy codes for new homes until 2000 or later.

¹ H. Gläser, *History of the development and industrial production of low-e coatings for high heat insulating glass units*, AGC Interpane, 2006.

More than four out of every ten homes (44%) in this country were built before 1970, at a time when virtually every residential window was single pane, clear glass.² Most of these single pane, clear glass (and double pane clear glass) windows are still found in millions of homes throughout the existing building stock.

There is no mandate requiring homeowners to upgrade the energy performance of single pane clear glass windows that were originally installed in homes 30 or even 40 years ago. If the energy performance of windows in the existing building stock is to be improved, it will have to be done voluntarily by owners of older homes. To secure the cooperation of these homeowners, they must be given credible, cost effective and, perhaps, most importantly, affordable alternatives.

Low-e Storm Panels are a credible and energy efficient alternative to replacement windows. They also represent a very affordable alternative. In that regard, the cost to install an energy efficient, low-e storm panel over a single pane clear glass window can be as much as **70% less** than the cost to replace a single pane clear glass window with a standard-size, double-hung, double-pane, energy efficient, low-e, vinyl window.³

This affordability of Low-e Storm Panels is critical, since, as of December 31, 2014, half of all households in the United States had an annual income less than \$53, 657.⁴ Moreover, nationally, the average cost to support a household of two adults and two children is slightly over \$48,000.⁵

The Energy Star Program's Framework Document for Low-e Storm Panels has identified a unique opportunity to realize significant energy savings on a national basis in a completely new way. The Energy Star Windows Program already identifies the best performing replacement windows. By establishing a complimentary Energy Star Program that identifies the best performing Low-e Storm Panels, the Energy Star Program will not only expand the number of technologies homeowners have to choose from, but, it will also vastly expand the number of households that can afford to upgrade the energy efficiency of the windows in their homes.

Energy Star labeling the best performing Low-e Storm Panels, will make Energy Star Products available to a vastly larger segment of household incomes, both above and below the median

² M. Sarkar, *How American Homes Vary by the Year They Were Built*, Demographic Directorate, Housing and Household Economic Statistics, U.S. Census Bureau, Working Paper No. 2011-18.

³ The cost to install the low-e storm panel is about \$139 to \$231, whereas, the cost to install the replacement window is about \$450 to \$600. J. Perritt, *How much does it cost to replace windows?* 2015; *Cost to Install Storm Windows*, Homewyse, 2016.

⁴ The 2014 Real Median Household Income in the United States, Economic Research, Federal Reserve Bank of St. Louis, 2015.

⁵ Lin and Bernstein, *What we need to get by*, Economic Policy Institute, Briefing Paper # 224, 2008.

household income. This is a critical if the Energy Star Program is to continue its success in addressing the millions of existing homes that still have energy inefficient single pane, clear glass windows.

2. Low-e Storm Panels Are Nationally Available From More Than One Manufacturer.

There are five (5) primary glass manufacturers in the United States.⁶ Four of them currently manufacture low-e coatings suitable for use in Low-e Storm Panels.⁷ Even a quick search of the internet reveals that numerous retailers make Low-e Storm Panels available nationally, including Home Depot, Lowe's, Larson Manufacturing Company, and Quanta Technologies, Inc., to name just a few.

There is no doubt that Low-e Storm Panels are broadly available, nationally, from far more than one manufacturer.

3. Product Performance Is Maintained or Enhanced With Increased Energy Efficiency.

Low-e coatings used on Low-e Storm Panels are extremely durable, and, in many cases, may actually be "harder" than the glass itself. In the southern zone, tinted glass will likely be used for greater solar control.

Tints and the low-e coatings designed for single pane applications, are extremely durable. Accordingly, the use of low-e coatings and tints, will enhance performance of storm panels and increase national energy efficiency.

4- Low-e Storm Panels Energy Performance Can be Measured and Verified by Testing.

The emissivity of coatings and solar transmittance (Tsol) of Low-e Storm Panels are both simple and can easily be measured and verified in accordance with existing industry standards, namely, NFRC 301-2014 for emissivity and NFRC 300-2014 for solar transmittance.

In due course, the Attachments Energy Rating Council ("AERC") will develop uniform standards for measuring and verifying the energy performance of Low-e Storm Panels and other window attachments. This may include U-factor and SHGC over base windows. For now, however, the use of emissivity and Tsol are completely adequate criteria upon which to identify the most efficient Low-e Storm Panels available in the market and move the Framework Document forward.

⁶ They are: (i) NSG/Pilkington North America, (ii) AGC Glass Company North America, (iii) Guardian Industries, (iv) PPG Industries, and (v) Cardinal Industries.

⁷ PPG recently sold the facility it used to apply residential hard-coat low-e, temporarily ending its ability to produce a low-e product suitable for use on Low-e Storm Panels.

5- Purchasers Will Recover Their Investment through Increased Energy Efficiency in an Extremely Short Period of Time.

The Framework Document properly documents that Low-e Storm Panels have an expected incremental payback of approximately 5 years or less from increased energy efficiency. A five year payback is extremely short, especially since a ten year payback (or even longer) is often considered acceptable in the context of building code adoptability. Such a short payback period can only be considered extremely reasonable.

This extremely short payback period is also a critical component of moving the existing stock of homes that still have single pane, clear glass windows to greater energy efficiency. That is because, after the Low-e Storm Panels are paid for in energy savings over the first five years, the annual energy expense for those households will be less for many years, thus, proving the value of Low-e Storm Panels as a good consumer investment.

6- Energy Star Labeling Will Visibly and Effectively Differentiate Low-e Storm Panels

Storm panels are, by their nature, easily differentiated from replacement windows. There is no confusion in the marketplace between replacement windows and storm panels. On the other hand, low-e coatings are nearly invisible to the naked eye. Even experts trained to tell the difference between clear glass and low-e coated glass can have a hard time telling them apart.

In the marketplace, consumers can easily confuse clear glass storm panels for Low-e Storm Panels, although doing so would deliver significantly reduced energy efficiencies. Even if Low-e Storm Panels are clearly labeled as such, the average consumer is unlikely to be aware of the energy significance of choosing Low-e Storm Panels over clear glass storm panels.

Providing an Energy Star label for Low-e Storm Panels will clearly differentiate and immediately enable consumers to distinguish the most energy efficient storm panels available in the marketplace from those that are less efficient.

In short, all of the Energy Star guidelines for the development of a specification for Low-e Storm Panels are met .

II. EPA Should Move the Framework Document Forward Without Delay.

Approximately 40% of the existing stock of homes in the U.S. still have single pane clear glass windows. These windows represent a terrible energy waste which takes a terrible toll on energy efficiency on a national basis.⁸ Moreover, given that the median household income in the U.S. is

⁸ Court, KA. *Low-E Storm Windows: Market Assessment and Pathways to Market Transformation*. U.S. Department of Energy, p. 1.

roughly only \$50,000, the cost to replace the windows in many older homes is likely beyond the reach of a great many homeowners. Extending the Energy Star label to Low-e Storm Panels is an easy, cost effective and affordable way to complement the existing Energy Star Windows Program by extending it to households that, simply, cannot afford to purchase replacement windows.

AGC has been involved in efforts to move an Energy Star label for Low-e Storm Panels forward since its inception, nearly ten (10) years ago. Those efforts were frustrated, over a long period of time, by impediments in the development of a test standard for storm panels to be rated as “attachments” to base windows. Many other types of “attachment” products were, similarly, frustrated in their efforts to develop acceptable test procedures.

Ultimately, the Department of Energy chose to sponsor AERC, specifically, to address the energy rating of “attachments” to residential windows. That decision is a strong testament to the fact that more than enough time, and more than enough fossil fuels, have been wasted heating and cooling homes with single pane, clear glass windows. Adding an Energy Star label to Low-e Storm Panels is a credible, affordable and exceedingly cost effective way to incentivize owners of older homes to upgrade the energy efficiency of their single pane, clear glass windows, in turn, slowing, or even stopping, this waste of our non-renewable resources.

While great strides have been made to mandate the use of low-e glazing in new homes, before the emergence of the Framework Document for Low-e Storm Panels, the only progress made to improve the energy performance of windows in the stock of existing homes has been to provide Energy Star labels for replacement windows. It is time to expand the effort to better address the existing stock of homes and the Framework Document for Low-e Storm Panels does just that.

EPA should resist any effort to further delay the Energy Star labeling of Low-e Storm Panels. The Specification Framework Document for Exterior and Interior Storm Panels should move forward with all deliberate speed.

Very truly yours,



Christopher F. Correnti
Vice President, Secretary & General Counsel