

## **A WORD OF CAUTION CONCERNING HIGH PERFORMANCE GLASS**

High performance glass is the talk of the building industry. Terms such as Low Emissivity, Heat Mirror™, Pyrolytic, Sputtered, Argon Filled, Double Sealed, SuperSpacer™ and others are being used with increasing frequency. Trade magazines are featuring articles on high performance glazing in one issue after the other. And why not? Energy conservation is serious business.

Unfortunately, and as with any new, high-tech products, the relevant details are usually complex. Miscommunication, misunderstanding, mistakes and misuse come with the territory of high performance glazing as well. While we do not profess to be expert in physics or chemistry, we have had significant and increasing experience with the testing and use of several of these new products and would like to take this opportunity to share the following thoughts with you.

### **Composite SuperSpacer vs. Double Sealed Aluminum Spacer in Insulating Glass:**

As technology changes, so too must Woodstone's recommendations to its clients. The latest update with regard to Insulating Glass (IG) involves spacers and Woodstone now recommends Edgetech's® SuperSpacer® composite "Warm Edge"™ system over traditional aluminum spacer for several reasons.

First, SuperSpacer'® original claim to fame is its 'Warm Edge' technology that prevents heat transference through the spacer. Aluminum, as we all know, is an excellent conductor of heat and cold and condensation can appear at the glass edges of aluminum spacer when exterior temperatures fall to near and below zero degrees Fahrenheit.

Another advantage is that full perimeter SuperSpacer®, with three clean ninety degree bent corners, can be used on the narrow True Divided Lite low profile muntin configurations common in historic replicate windows and doors, where aluminum bent corners cannot. This feature eliminates the need for cut-off corners and 'corner clips', one of the weak links in the traditional aluminum spacer IG system, and various high performance and restoration glass can be used with SuperSpacer® too.

Furthermore, SuperSpacer does not become superheated in direct sunlight, as aluminum tends to do, especially where darker colored spacers are used.

The sealant used with SuperSpacer® is applied at approximately 400 degrees Fahrenheit and is, therefore, able to withstand the significant heat buildup from direct sunlight much better than small true divided lite aluminum spacer with the so-called 'double sealed' system using Polyisobutylene and Silicone.

When using SuperSpacer® to replace failed aluminum IG spacer, color matching to aluminum spacer is not always perfect. However, it is close enough that Woodstone recommends that any failed IG with aluminum spacer be replaced with SuperSpacer IG and we are hopeful that the manufacturers of SuperSpacer will expand their line to include more colors. In the meantime, color samples of aluminum and SuperSpacer are available for your review.

SuperSpacer is, however, not compatible with the Southwall Technology's® Heat Mirror IG in which films are suspended within the air space to create triple glazed IG units. Only stainless steel spacer can be used with Heat Mirror because of the tension required to stretch the film. But Heat Mirror is applicable only for larger pieces of glass and very wide muntin profiles.

Woodstone has used SuperSpacer® for selected projects for nearly 20 years and we now have legitimate in-the-field experience, in addition to our Insulating Glass Certification Council (IGCC) testing, showing significant decreases in seal failure rates over the traditional double sealed aluminum spacer system.

**There is currently no generally accepted combined standard for performance, appearance, texture or compatibility of most high performance glazing techniques:** The National Fenestration Rating Council® (NFRC), National Glass Association®, U.S. Department of Energy, American Society of Heating®, Refrigeration and Air Conditioning Equipment and others are scrambling to establish various benchmarks. However, there is no indication that unified standards covering all possible aspects of custom glazing specifications will be established anytime soon and, furthermore, that those standards will be acceptable to the industry.

**Variations in performance, appearance, texture or compatibility of any high performance glazing is to be expected:** Clients may specify glazing type and glass product manufacturer.

**Visual standards for Flat Glass, Tempered/Heat Treated Glass and Laminated Glass:** While Woodstone uses the highest quality glass appropriate for most architectural glazing applications, visual glass imperfections, distortions and blemishes do occur and the following specifications define the acceptable standards for most Woodstone glazing products.

- **Flat Glass:** Woodstone uses Flat Glass in its products conforming to ASTM Designation C 1036 for Cut Size Quality Q3 and Cut Size Quality Q6 for Patterned and Wired Flat Glass. All Heat Treated Glass (i.e. Tempered Safety Glass and Heat Strengthened Glass) conforms to ASTM Designation C 1048 specifications for warp and distortion. All Laminated Glass conforms to ASTM Designation C 1172

specifications. If you would like to see the ASTM specifications for any of the glass types listed above, please contact Woodstone's Client Services Department.

- Specifications for glass not listed above, including but not limited to all artistic glass, leaded, bent, beveled, and restoration glass, is not included and determined on a project by project basis.

Note: This circumstance is especially relevant in the manufacture of custom windows and doors where glass sizes vary from order to order, various glass manufacturers may be used on the same project, and expensive larger scale fabricating methods are typically not applicable to one-of-a-kind orders.

**Hard Coat Low E (pyrolytic) coatings vary in color from one manufacturer to another and often vary from time to time from the same manufacturer:** It is very difficult (next to impossible) to match coloration when adding to or replacing glazing that was manufactured several years ago. While the consistency factor is improving with individual manufacturers, differences from one manufacturer to another persist for many reasons.

Note: Coloration of Soft Coat Low E (Sputtered) coating does not seem to vary as much as Hard Coat Low E, especially soft coatings on suspended on the interlayer films in laminated glass and Heat Mirror glazing.

**Argon gas is an elusive material:** Because the molecular structure of Argon is so tiny, the gas tends to leak from sealed IG units over a period of time. Furthermore, Argon is odorless, colorless, virtually undetectable without using expensive and sophisticated instruments, and provides relatively marginal increases in efficiency – see table below.

## **Table from the Green Consumer Guide of Window Insulation**

February 2005

Typical U values:

The U value of single clear glass is 5.4

With ordinary double glazing the U Value is improved to 2.6 [a 107% increase in efficiency]

With Low-E glass the U value is improved to 1.8 [a 44% increase in efficiency over ordinary IG]

If argon gas is used to fill the air [space], the U value will improve to 1.6 [a 12.5% increase in efficiency over IG w/ Low E]

Standard clear insulating glass (IG) is a significant improvement in efficiency over single glazing. IG with Low Emissivity (Low E) glass provides a significant although

somewhat diminished improvement over ordinary IG. Laminated glass with sputtered Low E in the IG increases efficiency and adds UV protection, and Heat Mirror applications can provide significantly higher performance as well as Low Emissivity and UV protection, but again, Heat Mirror is applicable only for larger pieces of glass and very wide muntin profiles.

Woodstone's policy on the use of these products continues to be one of caution. Coloration differences may prove to be an aesthetic nuisance. Argon Gas may not be worth the investment until sealing techniques are improved. The pay back from using Hard Coat Low E coatings may be much longer than previously anticipated. And there are acceptable alternates to these products that provide only slightly diminished performance levels.

Lastly, Woodstone identifies each piece of insulating glass that is installed in any of our units. The documentation includes the name of the manufacturer, the date of manufacture and the specific high performance qualities for that unit. Identification is essential for Wave Length Sensitive Coatings, Low Emissivity Coatings and Reflective Coatings specified to satisfy the optimum requirements for every unique circumstance created by climate and/or the directional exposure of your building elevations as well as future maintenance and replacement parts.

*Caution: Single glazed pieces of glass are often not identifiable because there is no suitable area on which to place a label that is not in the visible glass area of each lite.*

If you have any questions concerning High Performance Glazing, please contact the Woodstone customer service department.

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