

Use of Retrofit Films

The use of retrofit films on the indoor pane (#4 surface) of insulating glass units has been promoted by film manufacturers to reduce heat gain (reflective films) or to hold glass in place (clear films) if the glass should fracture. Because these films can potentially produce glass breakage and/or IG unit seal failures with some IG unit constructions, this bulletin will review the potential problems with the use of these retrofit films, and Cardinal IG Company's position on the use of these films.

Thermal stress in glass and the potential for thermal stress breakage is influenced by many items i.e. glass solar absorption, edge quality, glass thickness, outdoor temperature conditions, glass orientation, outdoor shading conditions, indoor shading devices, and the type of framing material used. When reflective retrofit films are adhered to glass to reduce heat gain and glare, these films will reflect solar energy back into the insulating glass unit, increasing the central temperature of the indoor glass pane and significantly increase the potential for thermal breakage. A tensile stress will occur at the glass edge due to the temperature difference between the central portion of the glass and the glass edge. When this tensile stress exceeds the tensile strength of the glass, glass breakage will occur.

The use of clear and reflective retrofit films has been promoted to hold glass in place if the glass should fracture. With impact breaks, high stress breaks, or tempered glass fractures, resulting in small particle sizes, there is the

opportunity that the glass could fall out of the opening in one piece adhered to the retrofit film. Naturally this should not occur with low stress breaks of annealed glass where the particle size is large. Any reference to glass products meeting safety codes with retrofit films should be reviewed with the film supplier.

Because reflective retrofit films reflect solar energy, they also reflect UV energy into the sealants of the insulating glass units. These sealants are then exposed to increased temperatures and increased UV exposure. Since there are many retrofit films which have varying degrees of solar reflectance and absorption, use of some of these films can significantly increase glass, airspace and sealant temperatures. These temperature increases can lead to premature failure of the IG unit.

Glass breakage has been observed when retrofit films are applied to glass products. This can be caused by cutting away of the film with a razor blade, utility knife or sharp instrument causing a scoring or damage to the glass surface.

Cardinal's position on the use of retrofit films is that Cardinal does not recommend the use of retrofit films due to the potential of either premature IG unit failure or glass breakage.

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