



Case Study:

Laminated glass with SentryGlas<sup>®</sup> ionoplast interlayer provides hurricane impact protection, while maintaining a modern, high quality, transparent appearance for Secrets The Vine luxury hotel in Mexico

By specifying laminated safety glass with SentryGlas<sup>®</sup> ionoplast interlayer for all its exterior hotel room windows and doors, as well as for balustrades and facades in communal guest areas, 'Secrets The Vine' luxury hotel resort in Mexico has ensured maximum 24/7 protection of its building and occupants from hurricanes, while also maintaining a high quality, modern, transparent look and feel for its guests.

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*By using laminated safety glass with SentryGlas® interlayer in exterior windows and doors, the building owner is able to provide 24/7 protection against hurricanes, while still preserving the clean, modern, high quality appearance of the hotel.*

By specifying laminated safety glass with SentryGlas® ionoplast interlayer for all its exterior hotel room windows and doors, as well as for balustrades and facades in communal guest areas, 'Secrets The Vine' luxury hotel resort in Mexico has ensured maximum 24/7 protection of its building and occupants from hurricanes, while also maintaining a high quality, modern, transparent look and feel for its guests. Laminated safety glass with SentryGlas® was chosen for this project because of its high impact protection, excellent post glass breakage performance and for its superior edge stability in high humidity conditions.

Located on a picturesque beach on the Caribbean coast in Cancun, Mexico, Secrets The Vine is a luxury, adults-only hotel resort with 495 rooms, six gourmet restaurants, three bars and a very modern, cutting edge architectural design (by Edmonds International) throughout the resort.

The hotel is situated in a region where there is a high risk of hurricanes. Therefore, when it came to selecting a suitable glazing solution, the hotel developer, Frel Ingenieros y Arquitectos of Mexico, wanted protection for the building and its occupants without awkward, cumbersome-looking hurricane screens, which would not complement the hotel's modern, clean, transparent aesthetics.

In total, 20,000 m<sup>2</sup> (215,000 sq. feet) of laminated safety glass with SentryGlas® was installed throughout the hotel. Of

this, 15,000 m<sup>2</sup> (161,000 sq. feet) were used on the exterior of the building, for the hotel room windows and doors, with the remainder used internally for communal area balustrades and lobby facades.

### **Hurricane impact protection**

The wind loads in Cancun and the frequent hurricanes in the area are of a similar strength and magnitude to those found in the High Velocity Hurricane Zone in southeastern Florida, USA. The glazing consultant on the project, Grupo Sela of Lerma, Mexico, therefore recommended that similar, high quality glazing standards were used on the hotel. The glazing has to withstand wind gusts up to 155 mph (250 km/h), as well as any associated impacts from windborne debris resulting from a hurricane.

To achieve a high level of hurricane impact protection, a custom reinforced aluminium window system was developed for the hotel rooms. These aluminium-reinforced profiles were specially developed to resist the high wind design pressures. Everything from the anchors to the gaskets of the window had to be designed specifically for use in the hurricane-prone region. For high impact protection, it was necessary to include a laminate in the glazing. SentryGlas® interlayer was selected for this purpose - a joint decision by Grupo Sela (glazing consultant) and the glass laminator on the project, Productos de Valor Agregado en Cristal (PVA). SentryGlas® was selected because of its high

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impact resistance and excellent post breakage performance. Due to the high wind pressures and potential impact from windborne debris, the glazing had to remain in its fenestration system without being breached by subsequent impacts or strong gusts of wind - even after being broken. SentryGlas® was the ideal interlayer for this because, even after the glass is broken, the high stiffness of SentryGlas® allows it to remain firmly attached to the aluminium framing system, thus providing superior building envelope protection compared to traditional PVB interlayers.

Christian Lavalle, Associate Manager of PVA comments: "As laminator for this project, PVA did not consider any other glass interlayers, only SentryGlas®. Here in Mexico, there has definitely been a huge change in the market towards the use of SentryGlas®. In fact, more than 85 per cent of our glass laminating projects in Mexico's hurricane areas now specify the use of SentryGlas®."

"For this project, we worked very closely with Kuraray staff, including sales and technical engineers, who were all eager to support us throughout the duration of the project. We also had several site visits from Kuraray staff to our plant in order to review our production process, and to the project site to review our glazing installment process," he adds.

For hotel room windows and doors, two glass sizes were supplied: 1508 mm (60 in) x 3540 mm (140 in) and 1378 mm (54 in) x 3174 mm (125 in). The glass thickness/make-up comprised: 6 mm (236 mil) heat strengthened glass + 1.52 mm (60 mil) SentryGlas® interlayer + 6 mm (236 mil) heat strengthened glass.

#### The benefits of laminated glass with SentryGlas®?

In building projects, laminated safety glass with SentryGlas® interlayer is primarily used to protect exterior windows and doors, but also skylights, canopies, facades, balustrades and curtain-wall systems. The main function of SentryGlas® is to maintain the integrity of the building envelope by resisting the forces of high winds and rain, as well as resisting high impact forces from windborne debris. In addition, secondary considerations are to retain the glass in place if it breaks, providing security and preventing additional debris contribution during the wind event.

Basic advantages of using an ionoplast interlayer such as SentryGlas® in lieu of PVB based interlayers include higher design loading capacity, larger glass lite sizes, higher resistance to penetrations, greater intrusion resistance, dry glazing capability and better edge stability/durability.

#### Internal balustrades and facades at Secrets The Vine

Inside the hotel, a steel mullion system was used for the tall, fully glazed facades in the hotel lobby area, which also use laminated safety glass with SentryGlas®. This same glass was chosen for interior balustrades in communal guest areas. This came from a need to protect guests from falling glass in the event of glass breakage. The balustrades are of a monolithic laminated glass design, exposed at the edges, with a thin handrail along the top and fixed at the bottom edge into a single glazing channel.

As well as offering excellent post-glass breakage performance, SentryGlas® was also selected due to its superior edge stability in the high humidity conditions experienced at the resort. High humidity can cause severe delamination problems with other common laminates such as PVB, often within a few years of

being installed. However, in high humidity outdoor weathering tests carried out in Florida, laminated glass with SentryGlas® showed no signs of delamination or edge defects after 15 years exposed to the elements.

Laminated safety glass balustrades no longer need to be enclosed with an edge-frame in order to hide potential edge defects. With SentryGlas®, the balustrades' edges can be left exposed, eliminating the need to 'cap' the edges of the glass, providing uninterrupted views through the glass, whether internal or external to the building. Because of the superior strength characteristics, glass laminates with SentryGlas® can also offer more open edge options, as well as a reduction in the number of metal attachments or fixings.

For common area balustrades, the glass size supplied was: 1100 mm (43 in) x 1500 mm (59 in). The glass make-up specified was: 6 mm (236 mil) heat strengthened glass + 1.52 mm (60 mil) SentryGlas® interlayer + 6 mm (236 mil) heat strengthened glass.

For lobby facades, two different glass sizes were supplied: 2370 mm (93 in) x 4000 mm (157 in) and 2000 mm (79 in) x 2000 mm (79 in). The glass make up comprised 6 mm (236 mil) heat strengthened glass + 2.28 mm (90 mil) SentryGlas® interlayer + 6 mm (236 mil) heat strengthened glass.



High wind speeds and windborne debris from a hurricane can destroy a building within hours. Damaged bank building at Brickell Avenue due to Hurricane Wilma.

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A caution sign in front of storm clouds warning of a hurricane season.

### Benefits of laminated glass with SentryGlas® in hurricane applications

- Laminated safety glass with SentryGlas® ionoplast interlayer remains intact even if broken, providing a weather barrier that reduces the likelihood of total collapse of the building or widespread water damage.
- The glass laminate assembly along with the interlayer absorbs the energy of the debris impact, resisting penetration.
- Prevents injuries related to flying glass or exposed shards.
- When a hurricane advisory warning is issued, there is no need to board up window openings or to activate/mount shutters.

#### Companies Involved

Architect:	Edmonds International
Developer:	Frel Ingenieros y Arquitectos
Glass Consultant:	Grupo Sela
Laminator:	Productos de Valor Agregado en Cristal (PVA), part of Vitro.

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