



Case Study:

Banco Bolivariano Financial Group Sustainable Building, hand in hand with SentryGlas[®] ionoplast interlayer

Serving its customers for more than 30 years, Banco Bolivariano is one of the most important banks in Ecuador. Its new branch office at Guayaquil is not only at the forefront of new urban projects, but its sustainable design also highlights that the bank treats the environment as importantly as it treats its customers.

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The design of the building and its façade reduces solar energy gain, which precludes excessive use of air conditioning, while SentryGlas® improved the natural lighting, removing the need to turn the lights on inside the building.

In 2010 a project commenced that resulted in a modern and sustainable bank building that optimizes natural resources and minimizes environmental impact. Much of this light optimization can be put down to the use of SentryGlas® ionoplast interlayer in the laminated architectural glass panels used for the building's façade.

The Architect in charge of the project was Rodolfo Rendón, former Minister of Environment for Ecuador and current President of the Ecuadorian Sustainable Building Council (CEES). Rendón is widely acknowledged for his green building designs.

Estructuras de Aluminio S.A. Estrusa with broad experience in structures, responsible for the design and implementation together with Fairis, supplier of laminated glass, tempered and insulated, were the responsible companies for creating the large-area glass façade and part of the roof of the branch office. The challenge was to keep the inside cool even with an average annual outdoor temperature between 20 °C (68 °F) and 27 °C (80,6 °F).

It was decided to use a solution based on laminated insulating glass with SentryGlas®, a high-strength interlayer that allows architects to create safer railings, windows, floors and even hurricane-resistant façades. The idea was to have most of the building covered in glass with open spaces, while minimizing energy use.

The design of the building and its façade means that 63% of the solar energy does not go into this glass void, which subsequently precludes excessive use of electricity for air conditioning. Furthermore, SentryGlas® improved the natural lighting, with 33% of sunlight providing sufficient clarity, without the need to turn the lights on inside the building.

Many construction glass and setting alternatives were analyzed to determine the best solution that would help make the vision of the architect a reality... without being fettered by compliance to demanding global standards. SentryGlas® was chosen by the customer due to its strength and the possibilities it offered to create larger glass surfaces.

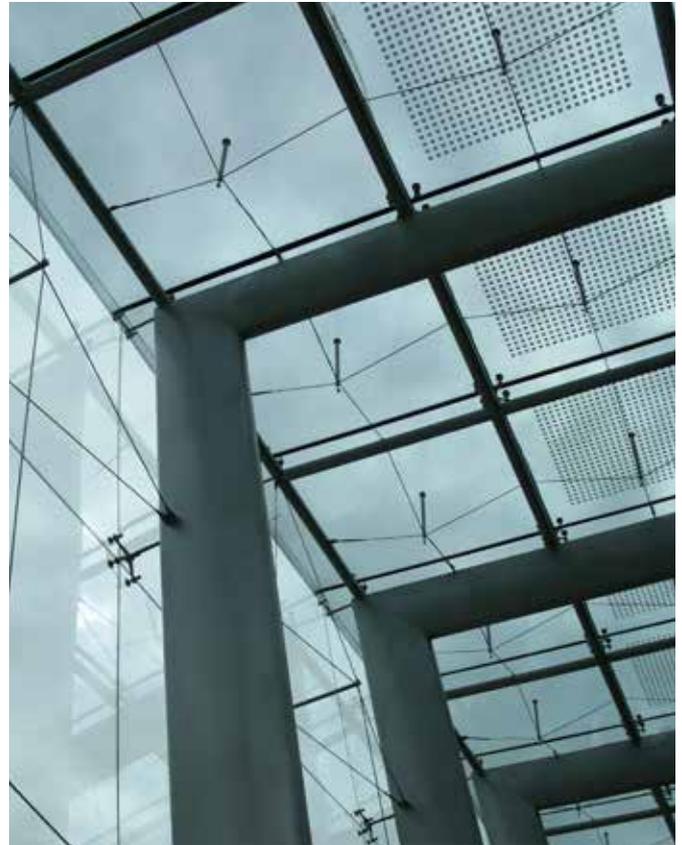
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Lighter façade panels enable more subtle supporting structures

For decades, interlayers made of polyvinyl butyral (PVB) have been the industry standard when producing laminated safety glass. Architects are well aware of the possibilities and limitations of such glass when used extensively in façade engineering, for roofing and window panels. In contrast, SentryGlas® enables an entirely new approach because the interlayer is over 100 times stiffer and five times stronger than PVB. As a consequence, there is an almost perfect transmission of load between two laminated sheets of glass, even at high temperatures, leading to the excellent flexural behavior of the glass when under load - also under direct sunlight in high summer. Accordingly, laminates with SentryGlas® show less than half the rate of deflection when compared to laminates with PVB, when under the same load, and thus almost the same behavior as monolithic glass of the same thickness.

Once placed on the facade and roof of the building, the customer also decided to use SentryGlas® on a walkway that forms the entrance to the building, with the cooperation of Alcrystal. For this, Fairis used three tempered glass panels and 1.52 mm (60 mil) SentryGlas® interlayers. The 14m entrance way offers exceptional performance figures in terms of light weight and safety.

The post-breakage performance of SentryGlas® offers the safety levels required to prevent people from falling from the runway in case of glass breakage, with the use of bigger panels that resist weight (1,80 m x 1m) (5.90 ft x 3.28 ft).



The SentryGlas® interlayer used in this process is one hundred times more rigid than conventional materials for lamination. With this kind of strength, glass can be a more active structural element. SentryGlas® also improves long-term climate resistance, and is much less vulnerable to moisture exposure or yellowing over time.



SentryGlas® was also used on a 14m (approx. 46 ft) walkway that forms the entrance to the building. The walkway comprises three tempered glass panels with 1.52 mm (60 mil) SentryGlas® interlayers.

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As well as improved strength and stiffness, other benefits of SentryGlas® include:

- **Safety:** In the event of breakage, glass fragments remain firmly bonded to the interlayer, reducing the chance for injury
- **Security:** SentryGlas® can be used in glazing that withstands bullets, hurricane-force winds and even bomb blasts
- **Durability:** SentryGlas® is extremely durable and resistant to clouding, even after years of exposure
- **Design Versatility:** SentryGlas® can be used in glass manufactured flat or curved, including annealed, toughened, heat-strengthened, spandrel, wired, patterned and color tinted glass
- **UV control:** SentryGlas® is available with or without UV transmittance

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