Durable, lightweight transportation glazing solutions take advantage of DuPont™ SentryGlas® interlayer strength and design freedom.
Stiff DuPont™ SentryGlas® interlayers make train carriage balustrades lightweight and secure

Balustrades made from SIGLAPLUS® laminated safety glass from FLACHGLAS Wernberg help protect passengers on the newly-developed RABe 511 double-decker train carriages from the Swiss company Stadler Rail AG.

Laminated safety glass is used instead of tempered glass because the balustrade needs to maintain a safety barrier even after the glass breaks. Thin, elegantly curved laminated glass made with strong, stiff DuPont™ SentryGlas® interlayer helps meet that requirement while contributing to carriage weight reduction.

Martin Rädel, sales manager for transport at FLACHGLAS Wernberg adds: “Stadler Rail sought a safe solution for every eventuality, which would neither require a guardrail, nor be heavier than toughened safety glass. By using SIGLAPLUS® with SentryGlas® interlayers, we have been able to provide them with a solution."

Ingo Stelzer, design specialist at DuPont explains the role of the safety interlayer: “By using high stiffness ionoplast interlayers instead of standard PVB (polyvinyl butyral), the point-fixed glass laminate is able to withstand greater loads at a given thickness. If the glass breaks, the interlayer maintains much higher strength, helping prevent passengers and luggage from falling to the lower floor of the carriage."

Weight-Saving Advanced Interlayer Technology

Finite element analysis of glass structures subjected to a centralised load of 5 kN (500 kg) showed that glass with a PVB interlayer would need to be produced at a thickness of 17.52 mm (8 mm glass/1.52 mm PVB/8 mm glass) in order to obtain the same level of resistance to deformation as a 10-mm-thick panel of toughened safety glass.

Stelzer continues: “With a 1.52-mm SentryGlas® laminating interlayer, two 5-mm-thick glass panels replicate the resistance of 10-mm toughened safety glass. The weight saving versus using laminates of PVB is close to 40%.”

Comprehensive laboratory testing conducted by FLACHGLAS Wernberg, which included pendulum impact tests, confirmed DuPont’s calculations.

Using a screen printing process, FLACHGLAS Wernberg creates clear and opaque versions of the new balustrade panels, which began service in 2011 on Swiss rail’s Zurich district passenger line.
Design colorful, informative, welcoming environments using DuPont™ SentryGlas® Expressions™ digital safety interlayers. Embedded inside laminated glass, the interlayer becomes a canvas for full-color creativity, filtering and reflecting light any way you imagine.

**SentryGlas® Expressions™ digitally printed interlayers are just the ticket for Spanish train station**

A recent, striking public installation of safety glass made with DuPont™ SentryGlas® Expressions™ decorative interlayer can be found at the ticket offices of Vollpelleres train station in Sant Cugat, a district of Barcelona, Spain. The safety-glazed walls and sliding doors form a barrier between the ticket office and the station's platforms. The laminated glass features a transparent image of a train carriage and its doors, digitally printed in high resolution on the SentryGlas® Expressions™ decorative interlayer. The image is embedded securely between two panes of float glass.

The decorative laminated glass panels were produced by Cricursa of Granollers, Spain, in partnership with Manusa Door System S.L. and Cristalería Juventud S.L., who produced and installed the doors respectively. Cricursa, a licensed user of SentryGlas® Expressions™ digital safety glass interlayer technology in Spain and Portugal, has a strong reputation for creativity and innovation and has developed a range of architectural glass solutions in SentryGlas® Expressions™ under its own tradename of Cridecor®.

The Vollpelleres train station glass panels consist of 6-mm clear float glass + 1.52-mm interlayer + 6-mm clear float glass. The train carriage images, provided by Impuls Idi (Girona, Spain) are digitally printed by Cricursa onto a transparent interlayer in full-color, using high definition, UV-resistant inks. The transparency and high degree of detail in the reproduced image adds the overall visual impression of the door and panels as well as its sense of space and modernity.

**Decorative Safety Glass Design Freedom**

SentryGlas® Expressions™ is a creative way for designers and artists to harness digital imaging technologies to produce a wide range of decorative glass results. Whether the laminated glass is used for self-standing internal walls, partitions and doors, stairway balustrades, tabletops, elevators, windows or entire external building facades, it adds a flair to any space.

In addition to its aesthetic appeal, SentryGlas® Expressions™ delivers the many benefits of laminated glass including safety, security, excellent outdoor weatherability as well as protection from UV rays and solar/thermal control.

Cricursa was founded in 1928 with the intention of bringing form, material and processing into high technology...
glass bending, in order to explore the possibilities of bent glass as a decorative element. After more than 80 years of experience, it now offers architectural glass, curved and flat interior and exterior glass, and is present in many of the most famous architectural works around the world. The company’s philosophy aims to achieve excellence in terms of quality and service, setting new standards of design and construction with the constant introduction of new glass-made solutions.

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