

Case Study:

**Frameless glass rail adds to an open-air experience at the Aer bar in Mumbai**

The strength, stiffness and clarity SentryGlas® ionoplast interlayer contribute to a stunning view that draws locals and visitors alike.

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*The glass rail's frameless design relies on the strength of the glass itself to carry wind and impact loads, aided by the stiffness and strength of SentryGlas® ionoplast interlayer.*

Perched 34 stories up in the air, the Aer bar and lounge atop the Four Seasons Worli in Mumbai, India, is becoming a popular destination for tourists and locals alike. It's the city's highest rooftop bar, commanding spectacular views of the sea and the cityscape below.

"You feel as though you have been transported to a different place. All you can see is the sea and the lights of Mumbai spread out like a blanket beneath you," says Aer bar manager Aditya Ramani.

The upscale casual design motif features chic, minimalistic furnishings that create a perfect place and to sit and relax with friends or mix in with a melting pot of international hotel guests.

Many come to watch the sunset, and experience the city's slow drift into night, its buildings illuminated from inside, its vibrant street life twinkling below. If that's not enough to help you feel "on top of the world," there's a frequent reminder as new guests arrive at the Aer bar, take in the stunning 360-degree panorama, and say "Wow!"

Even the locals are impressed. "Living here for 25 years, this was the first time I saw such a transformation on such a grand scale. The city lit up slowly and if the view during sunset wasn't pretty enough, with the lights on, the city looked beautiful, almost sexy," says local food and travel blogger Nishant Singh.

**Glass design accents the view**

One of the keys to experiencing the open-air feeling and breathtaking views that the Aer bar offers, is the designer's choice of safety glazing in the balustrade surrounding the lounge. Located at the edge of the rooftop, the glazing creates an almost invisible protective layer between guests and the wow-factor they experience gazing out and onto the city below.

Safety glass was a must, of course ... but the designer wanted an unimposing and highly transparent glass wall, that virtually disappears from view. For this effect, they chose a frameless design, relying on the strength of the glass itself, to carry wind and impact loads. Laminated safety glass made with SentryGlas® ionoplast interlayer fit the need perfectly.

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China Southern Glass laminated the glass balustrade panels, each measuring 1.7 meters by 2.3 meters (5,58 by 7,55 ft). The panels are line-supported at their foot. Each laminate consists of two 12 mm (1/2 ") glass panes, laminated together using a 3 mm (1/8 ") interlayer of SentryGlas®. The glass was installed by Permasteelisa, a multinational specialist in advanced architectural glazing.

### **SentryGlas® safety interlayer contributes to strength and clarity**

Among the advantages of using a SentryGlas® interlayer in minimally framed balustrade laminates is the material's higher stiffness and toughness compared with traditional safety interlayers. Even if a glass panel gets broken, the stiff SentryGlas® interlayer helps keep the selfsupported panel in place until it can be replaced.

Traditional interlayers are floppy and can cause a glass balustrade to fall over after breaking, which can create a dangerous gap in rooftop protection and a possible hazard below.

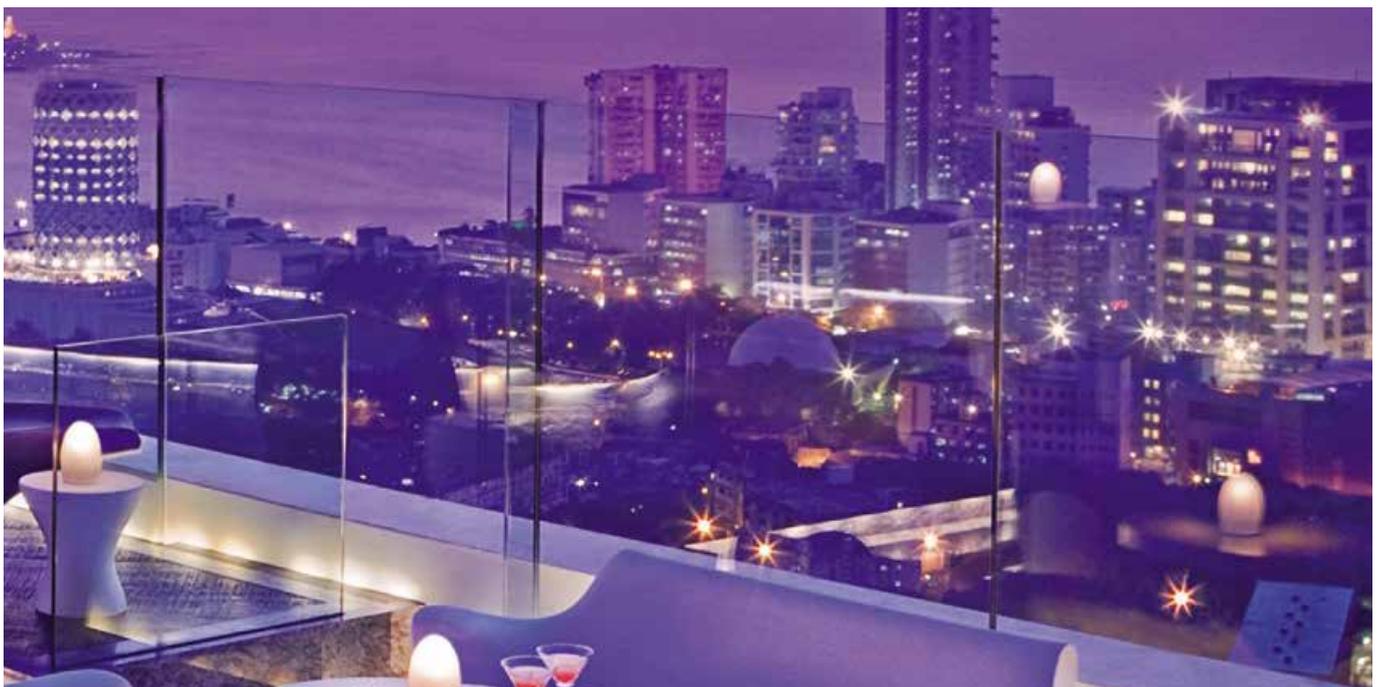
SentryGlas® is also exceptionally clear, which helps keep the view more natural and open. And, unlike traditional interlayers, SentryGlas® is more resistant to moisture intrusion at the edges, which helped the Aer bar design avoid any need for metal capping or edge-protecting of the laminates. The panels span clear from edge to edge, and across the top as well, for a perfectly engineered view.

### **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.

The Four Seasons Worli is not shy about promoting its rooftop attraction: "Marvel at the panoramic city and sea views and the endless ceiling of sky and stars," says their marketing material for the Aer bar. "It takes your breath away," explains Aer's Manager, Aditya Ramani.

Travel writers are crediting the Four Seasons Aer bar as one of the best spots to visit in Mumbai to see the sunset, and a crucial piece of the puzzle in Mumbai's pitch to be the most entertaining city in Asia in the coming decade.



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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 our without UV transmittance

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