



## **FACT SHEET: THE STRENGTH OF GLASS AT THE SPACE NEEDLE**

The glass used for the Space Needle's new revolving glass floor, glass barriers, and glass benches was designed like reinforced concrete. Each section was custom-designed with multiple redundant layers of structural glass fused together with a high-strength interlayer giving the glass composite a strength capacity up to five times the design loads used for code requirements.

On these sturdy glass structures, there is no single structural layer of glass; the systems at the Space Needle have a special high-strength ionoplast interlayer, and a minimum of three structural layers of glass each. With these redundant layers, the glass floor, glass barriers, and glass benches would still be structurally sound and safe even if one or more layers of glass were compromised.

The glass has been extensively tested and is designed to be very safe. All glass is tested for structural integrity under wind loads, live loads, and human impact. For example, typical impact loads for barriers are 400 foot-pound (a foot-pound is a unit of measurement of a one pound-force through a linear displacement of one foot). The barrier glass at the Space Needle has been designed and tested to be five times the strength of standard barriers to accommodate an impact load of more than 2000 foot-pound. Even though the glass barriers on the open-air deck have no framing, the 11 feet high and 7 feet wide glass panels are designed like the windscreen of a jumbo jet, so they can take all design loads even if the glass were damaged.

The glass floor is the strongest structural glass added to the renovated Space Needle. Between the revolving glass floor and its underlying soffit, there are a total of 10 layers of glass. The glass floor was designed for the highest of code requirements for floors. For floors, code required loads and testing are typically 60 pounds/square foot and 300-pound point loads. The glass floor at the Space Needle was designed for more than 100 pounds/square foot and 600-pound point loads all throughout the floor's surface. The glass floor is sturdier and safer than the previous revolving floor at the Space Needle and much stronger than standard office and retail floors in Seattle. This would mean that you could invite the entire Seattle Seahawks' defense – and all of the offensives they would face in the course of a season – to take a group photo on the glass floor without breaking a sweat. The very top layer of that glass floor is a scuff plate designed to be an aesthetic layer to protect the main stack of structural glass from scuff marks from shoes, heels, etc. The scuff plates are designed to be replaced periodically for visual clarity, but have no load-bearing responsibilities.