



Dow Performance Silicones

DOWSIL™ Structural Glazing Sealants Help the Tallest Building in Chile Withstand Glass Breakage During a Magnitude 8.8 Earthquake



Case Study: Torre Titanium La Portada



City and Country

Santiago, Chile

Products*

- DOWSIL™ 983 Silicone Glazing Sealant
- DOWSIL™ 791 Silicone Weatherproofing Sealant
- DOWSIL™ 982 Silicone Insulating Glass Sealant
- DOWSIL™ Primer-C

Key Participants

- **General Contractor and Part Owner**
Senarq S.A./
Abraham Senerman Lamas
- **Building Owner**
Inmobiliaria Titanium
- **Curtainwall Contractor**
Accura Systems Chile
- **Manufacturer**
Dialum S.A. Chile

*Prior to February 2018, products listed were branded as Dow Corning.

Project

Newly constructed Torre Titanium La Portada, the tallest building in Chile, survived a powerful earthquake just weeks after construction was completed. The movement capability of DOWSIL™ brand structural glazing and weathersealing products helped prevent glass breakage during this seismic event.

Just a few weeks after construction was completed on the 190+ meter Torre Titanium La Portada, Chile's tallest building at the time, the country was hit by a powerful earthquake that caused significant damage to roads, bridges and many older buildings in Santiago.



Thanks to the country's strict building codes and the use of high-performance construction materials, the Torre Titanium La Portada withstood the temblor with only the loss of one decorative fixture.

Designed with the Future in Mind

"Because the building is located between Santiago's Metropolitan Park and San Luis Hill, where the city narrows and wind and water are joined by the rhythm of nature and urban life, La Portada's tower facades were designed to imitate wind-filled sails and rotate on their vertical axes, acting as a great urban door," said architect Abraham Senerman Lamas.

Floor-to-ceiling panoramic windows, created using window bonding with silicone sealants, provide exceptional views of the Andes Mountains, while the curtainwalls are made of highly efficient, double-glazed panels to maximize light entry and minimize solar radiation.

In fact, Torre Titanium La Portada, which is constructed of reinforced concrete, granite, aluminum, steel and glass, is the first building in Chile to receive LEED (Leadership in Energy and Environmental Design) certification from the U.S. Green Building Council.

Constructed to Withstand the Not-So-Unexpected

Chile is no stranger to earthquakes. The strongest-ever recorded quake (9.5 on the Richter scale) occurred in Chile in 1960, and many other powerful earthquakes have hit the country since then. As a result, Chile has implemented internationally recognized seismic design codes to ensure that buildings can withstand these devastating events.

La Portada was constructed to withstand a 9.0 earthquake using high-performance building materials, including DOWSIL™ structural glazing sealants for adhering the glass to aluminum frames.

For the curtainwall system, the use of four-sided structural glazing with silicone weatherseals was chosen jointly by the architect and the curtainwall manufacturer over traditional gasketed systems.

"We have completed many successful projects using DOWSIL™ brand products, and so the choice to use their silicone sealants was an obvious one," said José Valdes, president of curtainwall contractor Accura Systems Chile. "In addition to the high product performance, we also make great use of the technical support services that Dow provides, such as blueprint reviews, product selection assistance, application training and adhesion testing."

DOWSIL™ 983 Silicone Glazing and Curtainwall Sealant was used in shop glazing of several substrates, including aluminum with an alodine finish, aluminum that was polyester powder-coated, aluminum that was painted with

a fluoropolymer, and glass. DOWSIL™ Primer-C was required for the polyester- and fluoropolymer-coated pieces. DOWSIL™ 791 Silicone Weatherproofing Sealant was used on galvanized steel and all of the above, except the alodine-finished aluminum.

Insulating glass unit manufacturer Dialum used DOWSIL™ 982 Silicone Insulating Glass Sealant as a secondary sealant for the many large IGUs incorporated into the structure.

Passing an Early – and Major – Test

The careful design and construction of Torre Titanium La Portada paid off much sooner than anyone could have anticipated. The building was completed on February 5, 2010, and was put to the test just three weeks later, when the magnitude 8.8 earthquake struck on February 27.

With the epicenter just 200 miles away, strong tremors shook Santiago for 90 seconds, causing damage to roads, bridges and many older buildings constructed prior to establishment of the strict building codes.

The Torre Titanium La Portada, however, weathered the quake with no structural damage and no glass breakage.

Flexibility was Key

Buildings specifically designed to survive the severe motion of the Earth during a seismic event must have flexibility to move with the shaking and vibrating of the ground. In the Torre Titanium La Portada, DOWSIL™ structural glazing sealants provide that all-important flexibility between the glass and aluminum frame, along with a flexible silicone weatherseal at the glass edge.

“The building was very well designed by the structural engineer, and the design of the curtainwall, which relied on the use of DOWSIL™ silicone sealants and was reviewed by Dow, also was an important factor in how the building performed during the earthquake,” Valdes said.

Because La Portada has so many large windows manufactured using silicone sealants, glass breakage was avoided in part due to the flexible Dow products used for the four-sided glazing and weathersealing. Each product was

applied according to Accura Systems’ sealant design requirements for use in a seismic zone.

The Show Goes On

Fortunately for the residents of Santiago, many other modern buildings in the city also survived the earthquake without any significant damage.

“Given that the Torre Titanium La Portada was the largest and tallest building in Chile at the time of the 2010 quake, we are extremely happy with its performance,” Valdes said. “We could not have expected anything better.”

With no damage to the building, it was possible for owner Inmobiliaria Titanium to officially open the Torre Titanium La Portada for business in April 2010, less than two months after the powerful earthquake tested its integrity.

Chile’s new tallest building at 280 meters – the Costanera Center, located near the Torre Titanium La Portada in Santiago – also is being built with DOWSIL™ construction materials.

Contact Us

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