Dow Performance Silicones

Dow Provides Silicone Solutions for the Guangzhou TV and Sightseeing Tower

DOWSIL™

Case Study: Guangzhou TV and Sightseeing Tower



City and Country
Guangzhou, China

Products*
- DOWSIL™ 993N Structural Glazing Sealant
- DOWSIL™ 995 Silicone Structural Sealant
- DOWSIL™ 791 Silicone Weatherproofing Sealant

Key Participants
- Guangzhou TV andSightseeing Tower Construction Co., Ltd
- Information Based Architecture (Holland)
- Shenzhen King Façade Decoration Engineering Co., Ltd
- Ove Arup and Partners International Ltd
- The Dow Chemical Company

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

The Project

100% DOWSIL™ silicone sealants were used in the frame supported glass curtain walls and spider fix curtain wall of the Guangzhou TV and Sightseeing Tower.

Project Description

Dubbed the "world's tallest tower," the Guangzhou TV and Sightseeing Tower rises 610 meters above the banks of the Pearl River. The Tower has a structural height of 454 meters and its antenna extends upward another 156 meters. Built at a cost of 2.2 billion RMB, the interior of the tower is divided into five functional zones and houses other luxurious facilities, including an exhibition center, an IMAX 3D theatre, garden decks, karaoke facilities, a hotel and a restaurant. This astonishingly tall structure has a narrow center portion or "waist line," which is accentuated by tapered structural column tubes running upward along its exterior.

The Challenge

The 610-meter-tall design and the hyperboloid architectural structure of the Guangzhou TV and Sightseeing Tower; the slight swaying of the tower which results from its tremendous weight; and its long, thin core structure all increase the difficulty of installing glass curtain walls. The types of glass curtain walls used in this

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project include frame supported curving glass lites, aluminum cladding, and spider fixing systems. With mast, the height of the curtain wall is up to 480 meters; the total area of the curtain wall is approximately 34,000 square meters.

The project's glazed curtain wall systems are designed with translucent frames, and because of the heavy wind loads that such a tall building must absorb, this system has particularly demanding requirements with respect to sealants. In addition to being strong enough to carry a very heavy wind load, it must have superior wiper gaskets that are able to satisfactorily respond to thermal expansion and contraction. The tower must also stand up to natural threats from torrential rains and air permeation. For this reason, careful consideration must be given to select a high-quality, durable sealant that is compatible with a variety of structural materials.

Effective Solutions

Three DOWSIL™ products were used to meet these various challenges: DOWSIL™ 993N Structural Glazing Sealant, DOWSIL™ 995 Silicone Structural Sealant, and DOWSIL™ 791 Silicone Weatherproofing Sealant. As is evident from its wide spread application in high rising buildings, DOWSIL™ 993N Structural Glazing Sealant creates a very strong bind. This product not only meets China's GB16776 standards, but also meets US ASTM C1184 requirements, as well as European ETAG 002 standards for structural bonding. Its strong binding properties, tensile strength and its ability to adjust positions where necessary will guarantee the long-term safety and stability of the Guangzhou TV and Sightseeing Tower. The weather resistant DOWSIL™ 791 Silicone Weatherproofing Sealant is extremely durable, and can guarantee that the building can withstand the effects of extreme weather. The properties of this sealant meet China's JC/T882 standards, GB/T14683 standards and the US ASTM C920 requirements for elastic sealants.

Professional Technology

At the same time, the project demands that air permeation standards of the curtain wall not be less than grade 3. In order to meet this target, Dow recommends that tape sealant or sealant be used at the connection point between the glass (or aluminum cladding) and the frame, with the thickness of such adhesive tape to be no less than 6 mm and sealant bite to be no less than 15 mm. In addition, Dow also provides professional technical support. After conducting tests for compatibility between the materials, Dow recommends that a primer be applied to the aluminum materials in order to strengthen the bind between the sealant and the foundation. Dow guarantees that the installation process meets all related regulation standards by conducting a professional evaluation of the blueprints and strain test of the sealant.

Construction of the Guangzhou TV and Sightseeing Tower completed in 2010, at which point the 610-meter-tall structure became an important milestone in Chinese architectural history. Since completion, the Tower has become an architectural symbol of the city of Guangzhou and the center of tourism and sightseeing for the city. Utilizing its high quality products and advanced technical expertise, Dow has helped to ensure that the "world's tallest tower" can become a reality.

Contact Us

Dow is collaborating with industry professionals around the world to develop solutions to improve the energy efficiency of buildings for a more comfortable environment. Learn more about Dow's full range of High Performance Building solutions by visiting us online at **consumer.dow.com/construction.**

Dow has sales offices, manufacturing sites and science and technology laboratories around the globe. Find local contact information at **consumer.dow.com/ContactUs.**

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