CASE STUDY: IFT TECHNOLOGY CENTER

Pushing the boundaries of commercial architecture through pure-glass building envelopes

German façade construction with DOWSIL™ brand silicone solutions revolutionizes proven performance of structural glazing

City and country

Rosenheim, Germany

Building

ift Technology Center

An Internationally-Renowned Authority on Building Product Testing

Project

Façade installation

Product

DOWSIL™ 983 Silicone Glazing and Curtainwall/Adhesive Sealant

Installation method

Four-sided hybrid hook-and-toggle SSG curtain walling system

Testing method

European Technical Approval Guidelines (ETAG) 002

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

A world of change

Modern glass façades are changing the face of commercial architecture and city skylines around the globe. A reflection of the architect's artistry, the façade is also arguably one of the most important aspects of a building's performance.

Dow had the foresight to predict this trend toward pure glass aesthetics with the creation of silicone structural glazing (SSG) curtain wall systems in the 1960s. This opened up a world of opportunity for designing building envelopes that not only push the boundaries of contemporary architecture, but are also proven to exceed the most demanding performance criteria for decades to come.

New method, new opportunities

The DOWSIL™ Silicone Structural Glazing (SSG) curtain walling method utilizes a structural silicone sealant that adheres glass to metal frames – without the use of visible mechanical fasteners – for improved architectural design freedom. Simultaneously, air and weather barrier solutions help architects improve the airtightness of the building envelope, saving energy and reducing costs of uncontrolled air leakage. The resulting façade is designed to permanently accommodate movement as it transfers wind-loads from the glass to the framework and to ensure long-term structural capability of building envelopes.

Breaking the glass "sealing" in Germany

In the 1980s, the use of SSG spread from North America to Europe, with one particular project breaking new ground in the advancement of pure glass aesthetics and testing methods to prove performance of 50-plus years. A new four-sided SSG system was installed in 1985 on the ift technology center building of ift Rosenheim in Germany – an internationally-renowned authority on building product testing.

"Four-sided SSG, with and without mechanical safety retention of the glass infill, expanded rapidly in Italy, Switzerland, France and the United Kingdom," said Andreas Wolf, consultant at A&S SciTech Consulting, who worked for Dow when the project was started and the test specimens were evaluated. "In the

1 FIRST

Installation in the world to use **4-sided hybrid hook-and-toggle design**

Structural glazing silicone **proven to last over 50 years**

German building **installation without safety retainers or deadload support**

"The techniques and designs of glass façades have changed, but I believe this SSG technology will be around in 50 and even 100 years," Wolf said. "I think façade bonding will actually increase because it's the simplest and most efficient way of attaching glass and other glazing elements to façades."

more conservative country of Germany, projects initially remained limited to two-sided or mechanically retained four-sided designs, making the progressive SSG installation of the Rosenheim even more significant."

In this system, special toggles positioned on the mullions and transoms interlock into a U-shaped channel profile applied within the silicone secondary seal of the insulating glass unit. Although toggle-glazed hybrid SSG designs are mechanically fixated to the substructure, the insulating glass edge seal is exposed to structural loads. Therefore, a durable and approved structural silicone is crucial to adhesively bond the U-shaped retention channel to the adjacent glass panes.

"These systems gained popularity over time partly because they provided an efficient, weather-independent installation process and, being completely concealed, achieved a flush structural glazing appearance of the façade interrupted only by very slender weatherproofing joints," Wolf said.

Passing the test of time

For 23 years, the ift Rosenheim building façade was exposed to outside temperatures ranging from -21.1 degrees Celsius to 32.5 degrees Celsius and solar radiation with an annual average of 1100kWh/m^2.

Although the DOWSIL™ 983 Silicone Glazing and Curtainwall/Adhesive Sealant had already undergone 25 years of environmental exposure, it passed the tests by meeting all the requirements, proving it could easily last an additional 25 years.

50+ YEARS PROVEN PERFORMANCE

Following this testing, DOWSIL™ 983 Silicone Glazing and Curtainwall/Adhesive Sealant became the first structural glazing silicone scientifically proven to last over 50 years.

It was then dismantled to be refurbished for improved energy efficiency of the building. After the façade had been stored in an unheated warehouse for two years, the natural aging behavior of the structural silicone sealant used in the installation was evaluated under number 002 of the European Technical Approval Guidelines (ETAG).

With its comprehensive range of tests and stringent assessment criteria, ETAG 002 is the most demanding standard for SSG sealants. The standard establishes key requirements for the SSG sealant's bonding strength and durability. The standard's requirements made are based on an assumed service life of 25 years.

The sealant was put through rigorous tests including Initial Mechanical Strength tests that evaluated bonding strength when subjected to tensile or shear forces acting on the joint at different temperatures, and the Residual Strength test that determined bonding strength durability.

A transparent future

With scientific support backing at least 50 years of performance, the proven durability and service life of DOWSIL™ brand SSG sealants has revolutionized the way commercial architects design commercial glass façades around the world. Beyond the proven testing, these cost-effective systems help create long-lasting building envelopes that address top trends for today's living and work spaces, providing improved energy efficiency, sound control and protection from fire, wind loads and extreme weather events.

For more information

Learn more about Dow's full range of High Performance Building solutions by visiting us online at **dow.com/construction.**

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

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Form No. 63-6332-01-0421 S2D