CASE STUDY

DOWSIL™ Solutions Help Solve Multiple Technical Challenges for High-Rise Glass Facade

One Central, Ningbo, China



Image 1: Ningbo One Central

The project

Ningbo One Central is located at the intersection of South Ningnan Road and Rili Middle Road in Yinzhou District, Ningbo, Zhejiang Province, China. The building stands 250.9 meters tall, spans 55 floors, and offers a gross floor area of approximately 160,000m^2.

Featuring a highly creative and groundbreaking architectural design, the tower's form combines the natural curves of a willow with the majestic stature of a poplar. The curtain wall features a unified glazed exterior with a sleek, modern design, while the approximately 80,000m^2 seamless glass façade reinforces its iconic architectural image and striking aesthetic presence. Once completed, Ningbo One Central will redefine the skyline of Ningbo's Southern Central Business District and become a new landmark that incorporates high-class sustainability principles.

Given the requirements of a high-rise glass façade system—robust structural assembly, long-term weather resistance, temporary protection before completion, as well as energy efficiency —the project team selected DOWSIL™ brand solutions to ensure excellent performance and long-lasting durability.

City and country

Ningbo, China

Products

DOWSIL™ 993N Structural Glazing Sealant

DOWSIL™ 791 Silicone Weatherproofing Sealant

DOWSIL™ 650+ Protective Peelable Coating

Building Owner

- Manhattan Resources (Ningbo) Property Co. Ltd

Architect

- Ningbo Urban Construction Design & Research Institute

Weatherproofing/ Field Glazing/ Curtainwall Contractor

- Zhejiang Zhongtianfangyuan Curtain Wall Co., Ltd.

Consultant

- Aurecon Engineering Consulting (Shanghai) Co. Ltd.

Completion Date

By end of year 2025

DOWSIL™

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The challenge

To address the distinct design and construction requirements of Ningbo One Central, its seamless glass façade system must factor in several considerations, including building height, climatic conditions, energy consumption, and environmental impact. This gives rise to four specific challenges.

Firstly, with the tower building exceeding 250 meters in height and situated in the coastal city of Ningbo, where wind forces are significant, the structural sealant used to fix the laminated insulating glass to the aluminium profiles must withstand high wind loads and suction caused by air pressure, ensuring a secure bond between the glass units and the curtain wall frame.

Secondly, many types of substrates, such as PEPC and PVF2, require specific testing to ensure compatibility and adhesion of the glazing material, thereby preventing bond failure and potential glass detachment.

Thirdly, the glazing structural sealant and weatherproof sealant need to withstand long-term harsh climatic aging.

Lastly, during transportation and on-site installation, robust temporary protection is essential for façade units to prevent surface contamination and scratches. Conventional PE protective films have significant drawbacks: they become sticky in high summer temperatures and leave difficult-to-remove residue when peeled, while in winter they harden, lose adhesion, and peel off. Rainy weather leads to wrinkling and deformation. These inadequacies can result in scratches or abrasions to the glass, escalating replacement and other unforeseen costs for contractors.

The solution

Dow's technical specialists worked closely with the project team, gaining a clear understanding of its specific needs and offering comprehensive Project Management Services (PMS). Ultimately, DOWSIL™ products were selected to ensure addressing a challenging array of technical, environmental and aesthetic requirements for this façade.

Following specialized testing at Dow's Asia-Pacific laboratories in Shanghai, China, where the physical substrates to be bonded were tested for adhesive and cohesive integrity, DOWSIL™ 993N Structural Glazing Sealant was chosen for the structural glazing of the glass to the profile. In addition to its inherent performance characteristics, such as long-term elasticity and UV resistance, DOWSIL™ 993N Structural Glazing Sealant can withstand high wind loads and thermal stress. It addresses challenges faced by the One Central's façade system in high-rise buildings, such as significant wind loads at high altitudes and large temperature difference.

DOWSIL™ 791 Silicone Weatherproofing Sealant was introduced to seal weather joints of the façade system, offering excellent weather resistance against sun, rain, snow, and ozone exposure. It retains exceptional performance under extreme conditions or sharp temperature fluctuations. In the humid climate or stormy weather of coastal Ningbo, its high movement capability and durable adhesion continue to ensure the façade's airtightness and watertightness.

DOWSIL™ 650+ Protective Peelable Coating is applied to protect glass surfaces during transportation and construction. It offers long-lasting barrier protection for up to 12 months, significantly outperforming traditional PE films, which typically last only 3-6 months. DOWSIL™ 650+ Protective Peelable Coating features a low-VOC formulation that is virtually odourless. Its peelable film can be safely disposed of after use, minimizing the environmental impact of construction activities.

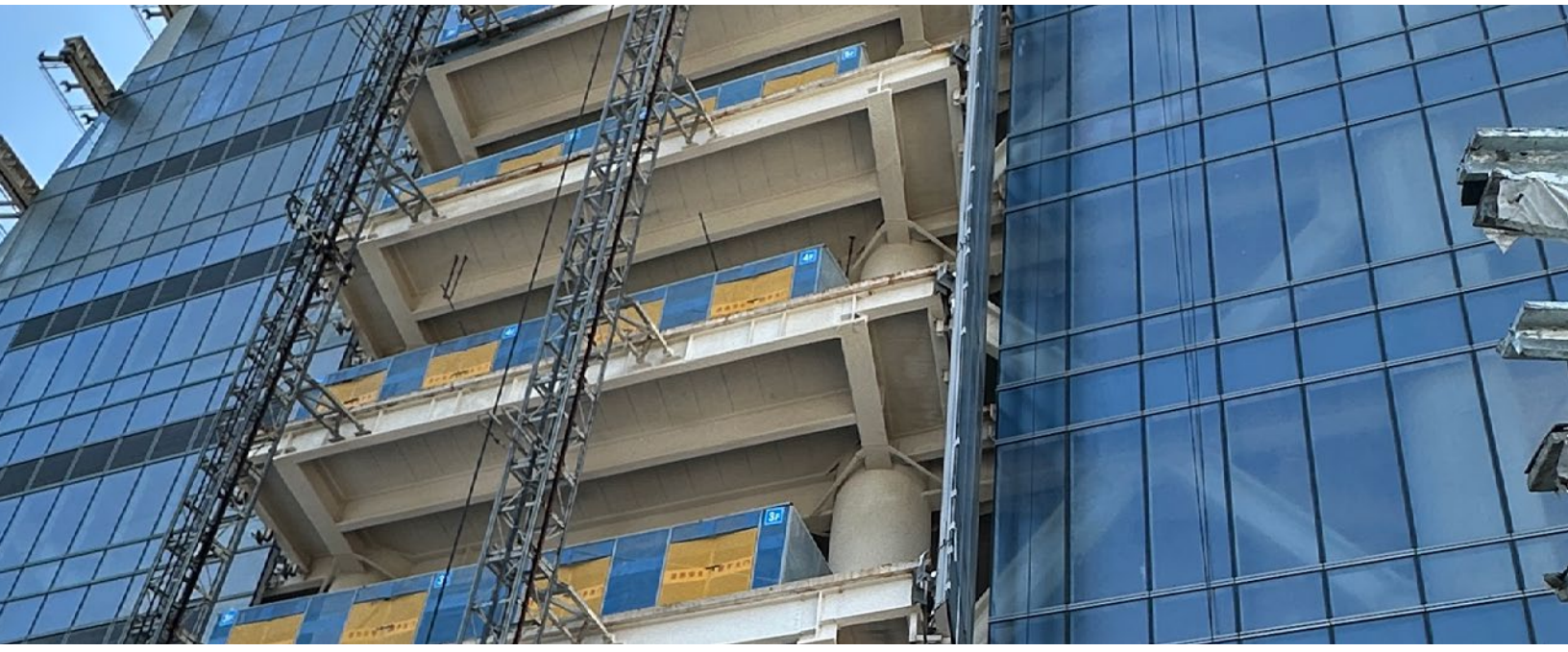


Image 2: Glass facade of Ningbo One Central.

DOWSIL™ 993N Structural Glazing Sealant

A two-component, neutral curing silicone, which has been developed for the structural bonding of glass, metal and other building components. Certified by European Technical Approval ETA 01/0005, DOWSIL™ 993N Structural Glazing Sealant offering excellent weathering properties and high resistance to UV radiation, heat and humidity once cured. It complies with various structural Sealant standards, like GB16776-2005, ASTM C1184, ETAG002, and is CE-marked.

DOWSIL™ 791 Silicone Weatherproofing Sealant

A one-part, premium performance weatherproofing silicone sealant designed for the weather sealing of structurally glazed façades, curtain walls and buildings constructed from traditional building products. It offers excellent movement capability (+/-50%), high elongation, and strong adhesion, along with excellent weather resistance. The sealant features exceptional weatherproofing capabilities, capable of withstanding harsh environmental conditions such as sun, rain, snow, and ozone exposure. It retains exceptional performance even under extreme conditions or sharp temperature fluctuations. It complies with GB/T 14683-2017, ASTM C920, and EN 15651 standards, and is CE-marked.

DOWSIL™ 650+ Protective Peelable Coating

A waterborne acrylic peelable coating designed for temporary protection of façade glazing and other surfaces. It creates a durable barrier against dust, grease, scratches, fingerprints, and welding splatter. It's adaptable to various shapes and substrates, including metals, powder-coated surfaces, wood, and low-porosity stone and the film peels off effortlessly without leaving any residue post application. The low-VOC, APEO (Alkylphenol Ethoxylates)-free formulation ensures it has a minimal impact on the environment.

** DOWSIL™ 650+ Protective Peelable Coating is APEO free, being manufactured without the use of APEO surfactants.*



Image 3: Glass panel with DOWSIL™ 650+ Protective Peelable Coating.



Image 4: Construction site of Ningbo One Central.

For more information

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

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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