

Silicone solves high altitude technical challenges at the world's tallest tower

Case Study: Burj Khalifa, Dubai



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City
Dubai
Country
United Arab Emirates

Products
Dow Corning® 993
Silicone Structural Glazing Sealant
Dow Corning® 3362
Silicone Insulating Glass Sealant
Dow Corning® 798
Clean and Coldroom Silicone Sealant

Architect
Adrian Smith, Skidmore,
Owings & Merrill

Structural Glazing Fabricators
Far East Aluminium, Hong Kong
Arabian Aluminium, UAE

Insulating Glass Fabricator
White Aluminium, UAE

Main Contractor
Samsung Engineering &
Construction

Developer
Emaar Properties

The Project

- With a budget for this project exceeding \$1.5 billion, the final height of the spectacular Burj Khalifa skyscraper soars to 828m above ground level, holding the record for being the world's tallest building and also for the highest installation of an aluminium and glass facade
- This iconic project has overcome the greatest of challenges and technical difficulties, not least of which are the wind forces dominating the structural design of the tower, the logistics of moving men and materials at extreme heights and construction of the building envelope
- A total of 103,000 square metres of glass was used in the cladding panels which are incorporated into a total facade area of 132,190 square metres
- These advanced cladding panels maximise resistance against heat transmission from the sun and save energy through the use of sophisticated engineering techniques which include high performance reflective glazing
- Managing the internal pressure foreseen within the insulating glass units due to the high altitude culminated in the specification of *Dow Corning* 3362 Silicone Insulating Glass Sealant
- *Dow Corning* 993 Silicone Structural Glazing Sealant was specified to bring additional security to the insulating glass units which were mechanically fixed to the superstructure
- *Dow Corning* 798 Cold and Cleanroom Silicone Sealant was specified for sealing the exclusive bathrooms within the prestigious apartments

The Burj Khalifa is part of an extraordinary 500 acre development called Downtown Dubai. The tower's design is derived from patterning systems embodied in Islamic architecture, and also takes inspiration from the harmonious structure of the Hymenocallis plant, which is native to the region. This iconic project breaks many records whilst overcoming the greatest of challenges and technical difficulties, not least of which are the wind forces dominating the structural design of the tower, the logistics of moving men and materials at extreme heights and construction of the building envelope.

The Challenge

As with any construction in the Middle East, *Dow Corning's* technical experts were confronted with testing and specifying products that are able to withstand the rigours of high temperature, ultra-violet light, seismic activity and inclement weather conditions including sandstorms and high winds. In addition, large areas of the curtain wall, which in total is equivalent in size to 17 soccer fields, are positioned at extreme height, which in turn, brings a new set of technical challenges.

The Solution

The unitized panels were interlocking on site and up to two storeys tall. Being positioned at such high elevations, the risk of pressure build up within the insulating glass units was alleviated through the specification of *Dow Corning* 3362 Silicone Insulating Glass Sealant, as a secondary perimeter seal. Silicone application was carried out by White Aluminium Enterprise who is a member of *Dow Corning's* Quality Bond – a recent initiative which provides technical training and support, designed to achieve excellence in quality control, quality assurance and standards of workmanship.

Whilst the shape of the tower along its height has been varied to minimize wind forces on the building, *Dow Corning* 993 Silicone Structural Glazing Sealant plays an important role in providing a strong adhesive bond, UV resistance and fast cure, in the joints between the insulating glass units and the curtain wall frame.

A global leader in silicon-based technology with local international presence, *Dow Corning* were readily available to consult with customers and supply technical expertise and products to project partners across Europe, Middle East, Korea and China.

Dow Corning 3362

Silicone Insulating Glass Sealant

A neutral curing silicone sealant specifically formulated for use as a secondary seal in the manufacture of high performance insulating glass units, with outstanding adhesion to a wide range of substrates including coated, enamelled and reflective glass.

Dow Corning 3362 has excellent temperature stability, is resistant to ozone and ultra-violet radiation and is certified by European Technical Approval ETA 03/0003 and complies with EN 1279 requirements.

Dow Corning 993

Silicone Structural Glazing Sealant

Certified by European Technical Approval ETA 01/0005, *Dow Corning* 993 exhibits excellent weathering properties and high resistance to ultra-violet radiation, heat and humidity once cured. It is ideal for structural bonding of glass and metal, including coated, enamelled and reflective glass.

Dow Corning 798

Cold and Cleanroom Silicone Sealant

A neutral curing, flexible, fungus resistant sealant suitable for use both internally and externally, *Dow Corning* 798 Sealant is highly flexible and has excellent adhesion to a wide range of porous and non-porous surfaces.

About Quality Bond

Quality Bond lifts silicone sealing and bonding to the highest level through the instigation of standards of best practice in quality control, quality assurance and product application by specialist silicone fabricators and applicators. Quality Bond allows customers and specifiers to share in *Dow Corning's* industry-leading expertise and benefit from our proven global performance track record. For more information, please visit: qualitybond.com

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