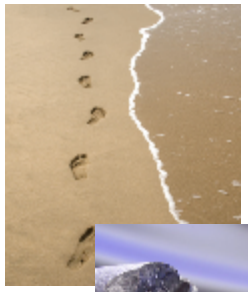
Proven performance, quality & productivity in structural glass facades

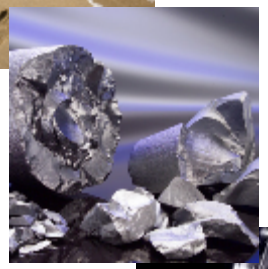
Pınar Çetin, GPD, Istanbul, 2017

From sand...to high performance

Sand



Si Metal



Si
Polymer

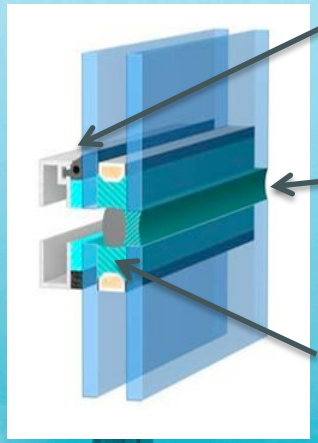
Unleashing the power of silicon to *benefit everyone, everywhere.*

DOW CORNING

Structural Glazing

Bonding of glass onto a metallic frame

- Frameless façade
- Improved aesthetics
- Increase design possibilities
- Air & water permeable
- Energy efficient



SG sealant
Glass to metal bonding

Weathersealant
(air & water tightness)

IG sealant
Glass to glass bonding

A Journey to Silicone Structural Glazing

1st 2 sided structural silicone application

1964

1971

455 W. FORT ST
Detroit
Architect: Smith Hincham & Grylls
First four-sided structural silicone application

MENTOR MUNICIPAL CENTER
Ohio
First four-sided structural silicone application unsupported

1976

IFT ROSENHEIM
Rosenheim
Toggle-glazed SSG

1985

1989

CAMERON CENTRE
Tsimashatui
First 4-sided structural glazing in Hong Kong

2002

OLD TRAFFORD
Manchester
Architect: AFL
Dramatic and imposing entrance façade

2003

WESTIN DIPLOMAT RESORT & SPA
Hollywood
Architect: Nichols, Brosch, Sandoval and Associates
Impact resistant glazing

2008

NATIONAL GRAND THEATER OF CHINA
Beijing
Architect: Paul Andreu
Curved glass, daylight opening

HARPA CONCERT HALL
Reykjavik
Architect: Henning Larsen Architects, Batteriid Architects
Complex reflective glass design

2012

2010

BURJ KHALIFA
Dubai
Architect: SOM
Extreme height and high windload

FLAME TOWERS
Baku
Architect: HOK International
Constantly curved design

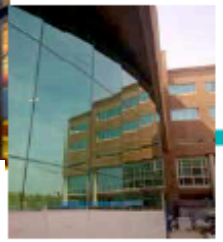
2013

2014

FONDATION LOUIS VUITTON
Paris
Architect: Frank Gehry
Free-form glass panels

ICE KRAKOW
Architect: Ingarden & Ewý Architekci, Arata Isozaki & Associates
Curved glass and ceramic panels

INSTITUTE FOR RESEARCH AND TREATMENT OF CANCER
Torino
Architect: Studio Cucchiarati S.R.L.
Crystal clear bonding



ALLIANZ TOWER
Milan
Architect: Isozaki + Maffei
Cold bent glass

SHANGHAI TOWER
Shanghai
Architect: Gensler
Megatall, high energy efficiency

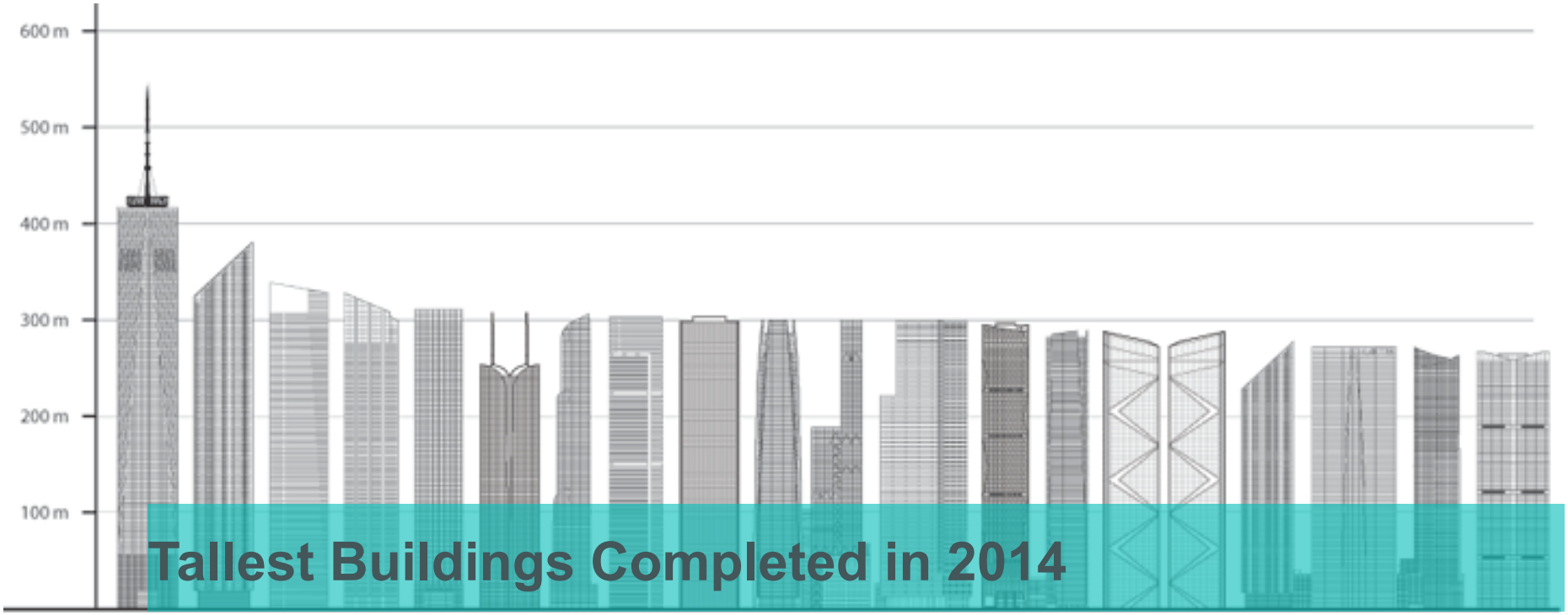
2015

CORNING MUSEUM OF GLASS
Architect: Thomas Phifer and Partners
XXL Glass structurally bonded

Structural Glazing since 1964

"Of the 50 completed ultra-high rise buildings in the world, 35 of them were built with Dow Corning High Performance Building solutions."

"GRAND DADDY" OF STRUCTURAL GLAZING:
The world's first four sided structural silicone glazing project Detroit, Michigan.



The Challenge: Estimating the Technical Useable Life of SSG Curtain Walls

Study 1: Calibrating ETAG 002 Test Requirements Against Actual In-Service Performance

The first generation of SSG, Dow Corning® 983 Silicone Structural Glazing Sealant - a typical toggle-system design broke new ground:

- The outer glass was not fixed with additional mechanical safety retainers
- The outer glass did not have any deadload support.

Since1985, the facade was exposed to:

- Outside temperature extremes from -21,1°C to +32,5°C
- Solar radiation exposure (annual average) 1100kWh/m²
- 200 specimens were cut from the SSG units

The dissembled SSG structure with its Dow Corning® brand structural glazing silicone, generation 1, successfully passed ETAG 002-1 and is theoretically proven for the next 25 years.

1985 - the southwest facing bow front façade section of a building at the IFT Rosenheim

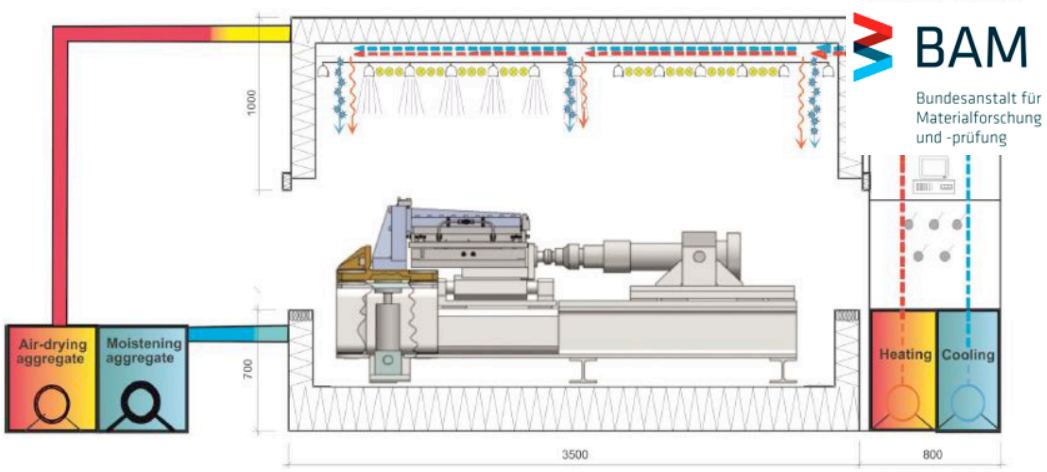
Study 2: Developing a Performance-Based Durability Assessment for SSG Sealants by Federal Institute for Materials Research and Testing Germany (BAM)

Dow Corning® 993 Silicone Structural Glazing Sealant was simultaneously exposed to artificial weathering and complex, multi-axial mechanical loadings

It still meets ETAG 002-1 performance criterions for residual tensile strength and adhesion after testing.

This test, corresponding to an anticipated service life of 50 years, is even more severe when compared to ETAG 002 and confirms a robust and outstanding durability underlining the **PROVEN PERFORMANCE** track record.

- ❑Dead-load, wind loads, human impact loads
- ❑Temperature, solar radiation
- ❑Chemical loads resulting from rain and cleaning agents



How did we achieved that?

- **Continuous innovation**
- Extensive Quality Assurance systems
- Smart Project Management

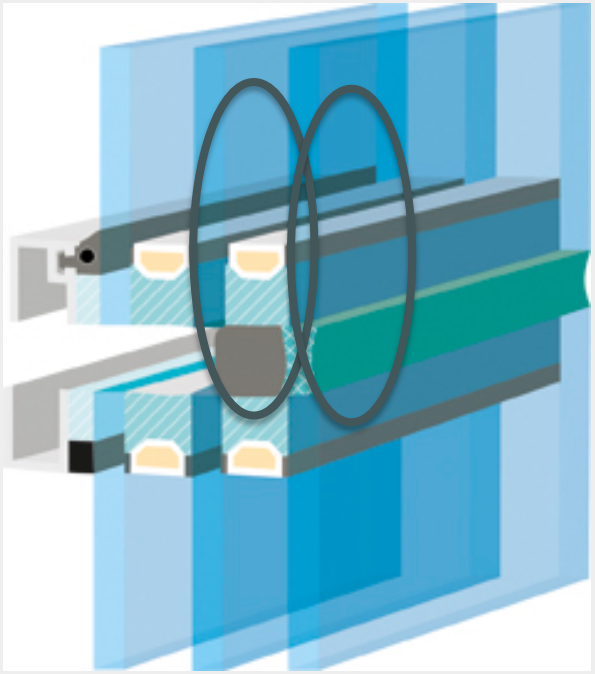
Continuous Innovation - defining the need

Demanding Facade trends

- XXL Glass
- High Wind
- Triple IG- Climatic loads
- Curved cold bended
- Protective glazing

Strength and slim joints

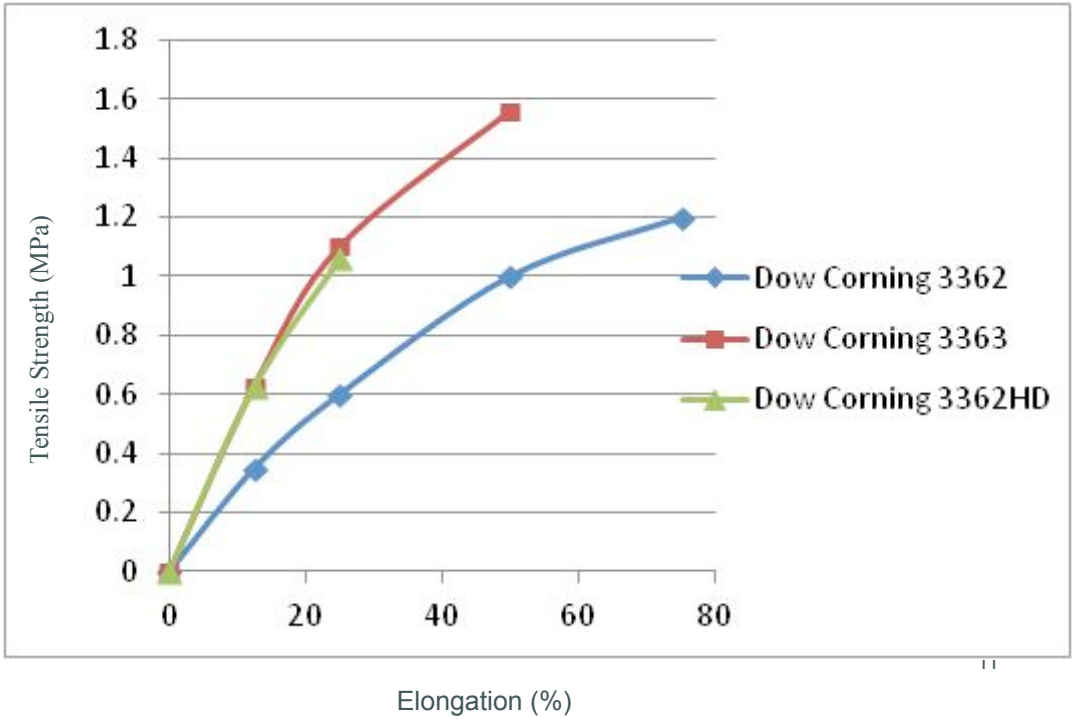
Central Bank of Baku



Continuous Innovation – development of new technology

Dow Corning ® 3363 - Outperforming strength...

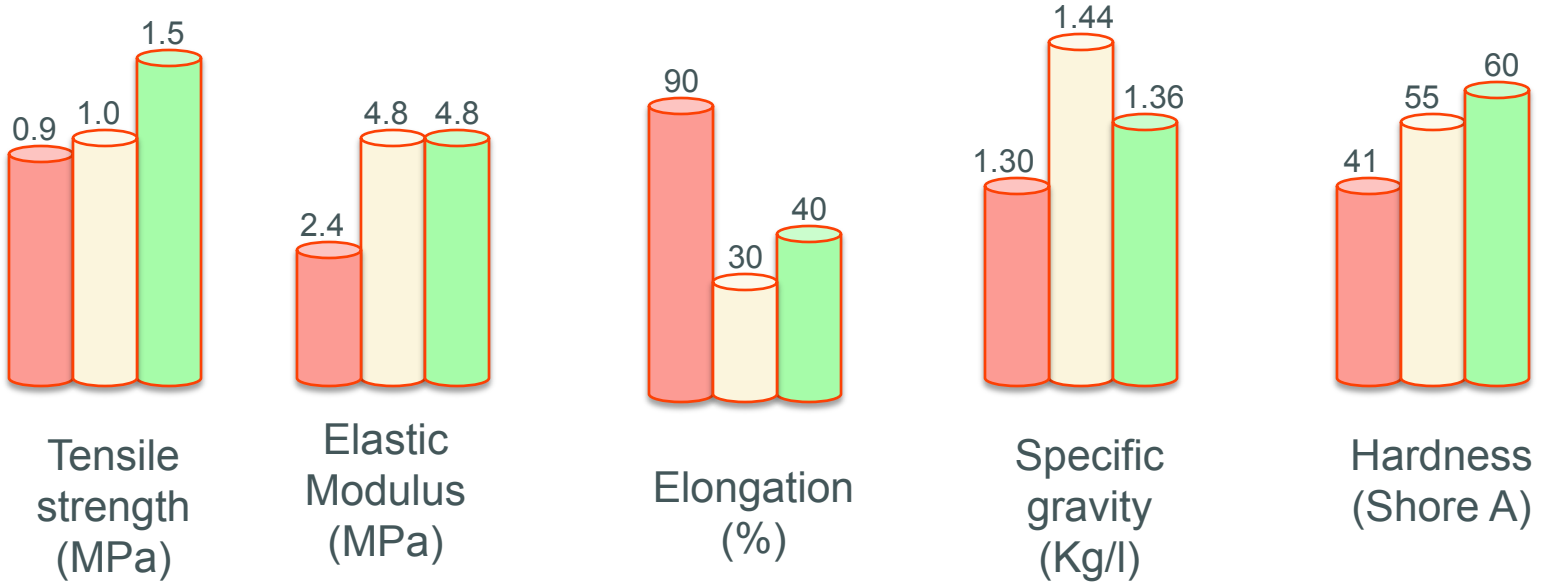
- Highest Design Strength (0,21 MPa) in market with ETA
- Good extrudability, lower pump pressure, etc.
- Good gas retention in IG application (EN1279 part 2+3)
- Excellent longterm durability



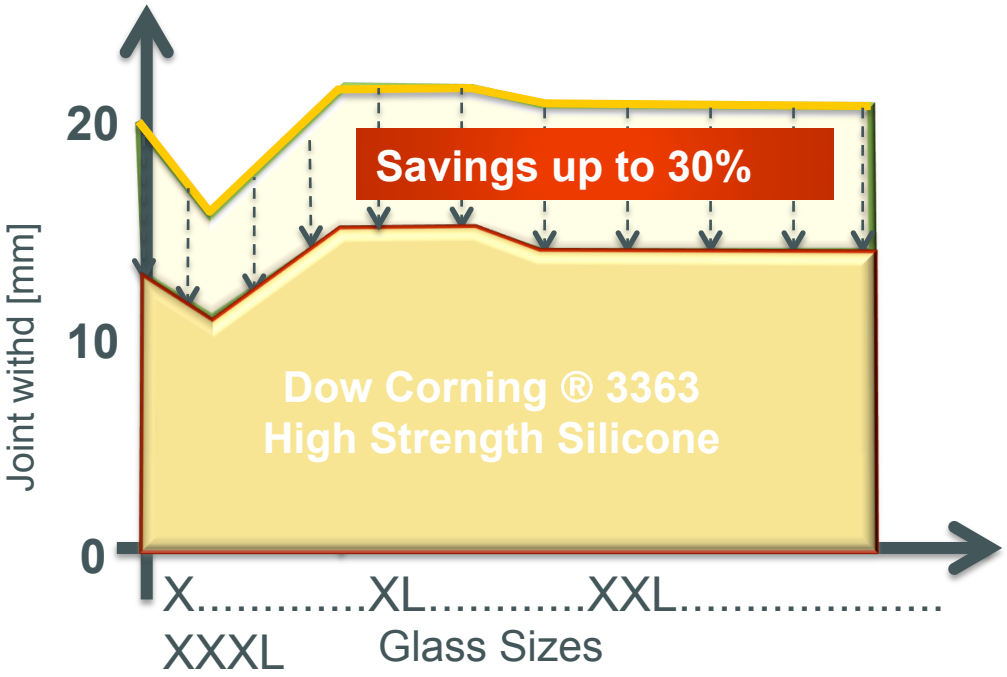
DOW CORNING

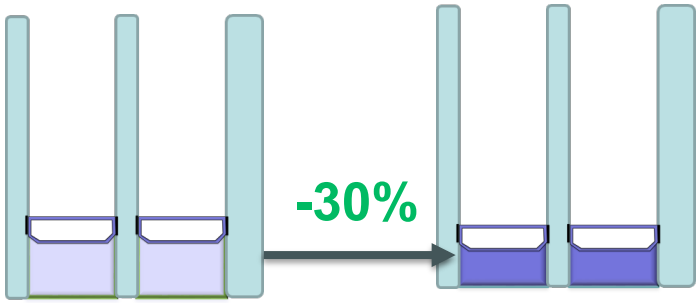
Continuous Innovation - Performances comparison

Dow Corning® 3362 IG Sealant	Generation 1
Dow Corning® 3362 HD IG Sealant	Generation 2
Dow Corning® 3363 IG Sealant	New Generation



Continuous Innovation - Benefits



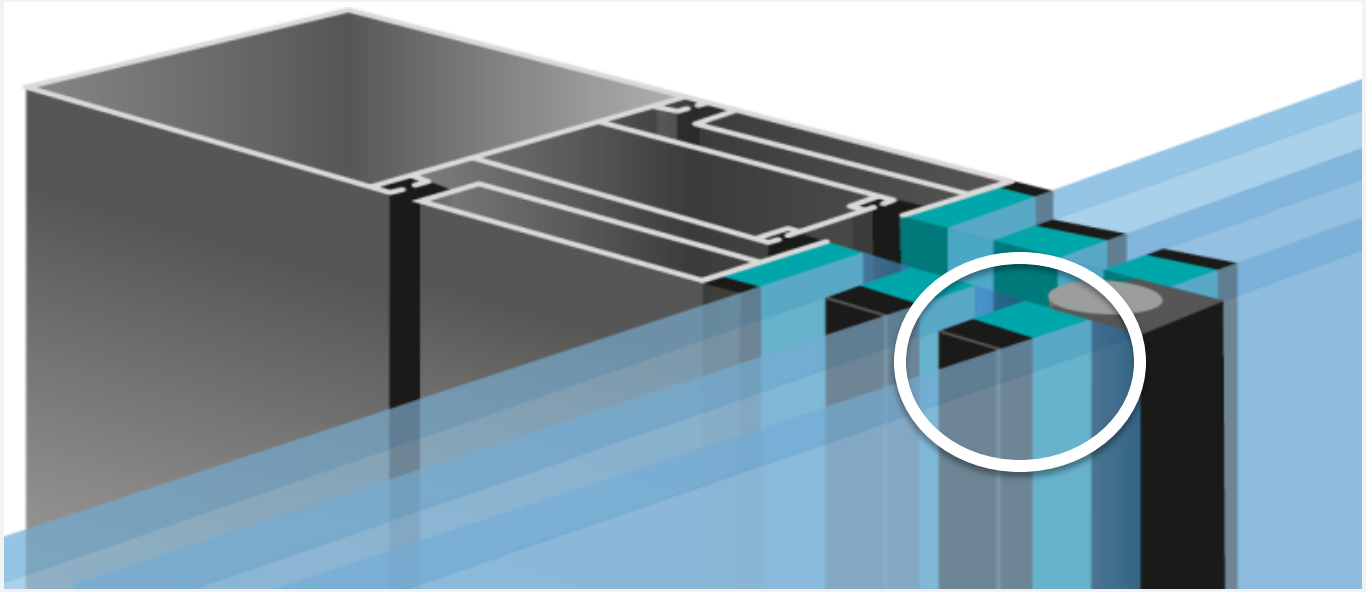


Slim edge designs
More light
Better Aesthetics
Higher Productivity

Design Strength 0,21 MPa (ETA)
Gas loss < 1% in 25years (EN1279-4)

DOW CORNING

Continuous Innovation - Higher productivity, better aesthetics and smaller joints



- High rise buildings & high wind, hurricane
- Bombblast
- Large glass sizes
- High climatic loads, especially in triple IG

Curved – Colored - Proven

Cold bended triple glazed insulating glass with middle grey secondary silicone
Combining performance, energy efficiency and design

Isozaky + Maffei Tower, Milano Italy 2014

How did we achieved that?

- ❑ Continuous innovation
- ❑ **Extensive Quality Assurance systems**
- ❑ Smart Project Management

INFLUENCE ON LONGEVITY

QUALITY BOND™ PROGRAM

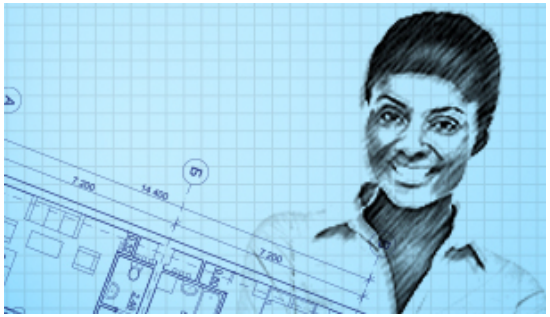
Dow Corning SG&IG Silicones are designed and tested to withstand harsh climatic conditions, mechanical loading and meet existing established global and local standards.

However it is important to carefully consider factors which might have an impact on durability. Here are some key areas:

- ✓ Joint design and dimension
- ✓ Chemical compatibility to adjacent materials
- ✓ Substrate quality and conformity
- ✓ Quality of workmanship

INFLUENCE ON LONGEVITY

QUALITY BOND™ PROGRAM is a concept to properly Track / Monitor / Control application quality



For Architectss:

- Specification of Quality Bond = the application will be applied by trained and competent applicators.
- Assistance with sealant specification.
- Gain the latest in knowledge sharing from like-mind parties and experts.
- Total technical support from design stage to installation continuing throughout the buildings life.

For Glass Processors:

- Priority consultation on both technical advice and services.
- Annual training and audit by Dow Corning
- Establish best in class quality control and quality assurance
- Extended warranty & liability offering
- Specification of Quality bond by Dow Corning and its partners.

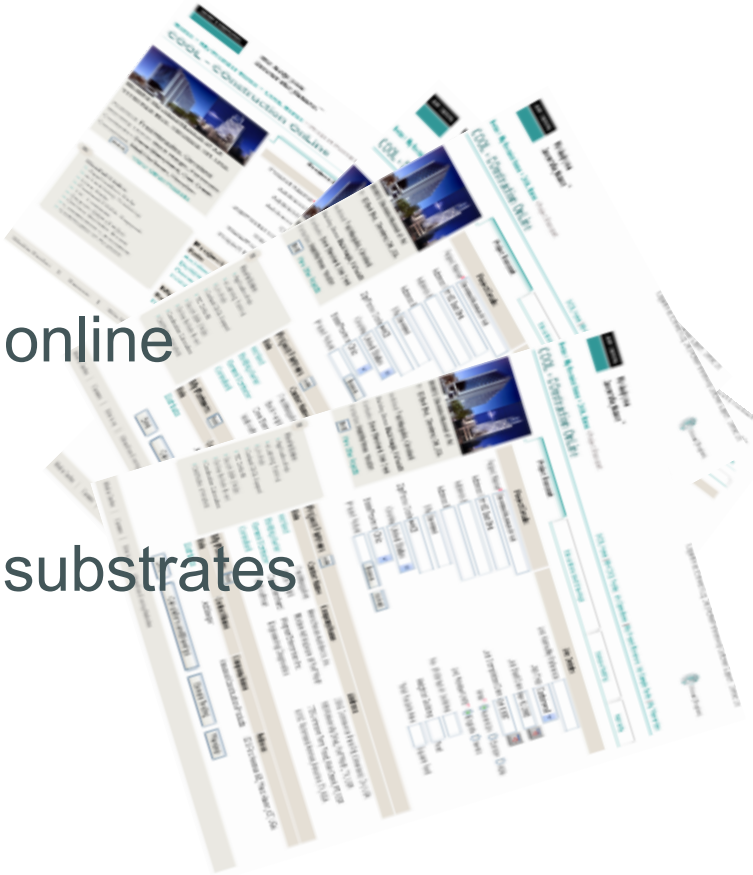
How did we achieved that?

- ❑ Continuous innovation
- ❑ Extensive Quality Assurance systems
- ❑ **Smart Project Management**

You want some cool ? COnstruction OnLine

→ **Create your own project database**
→ **Be fast and efficient**

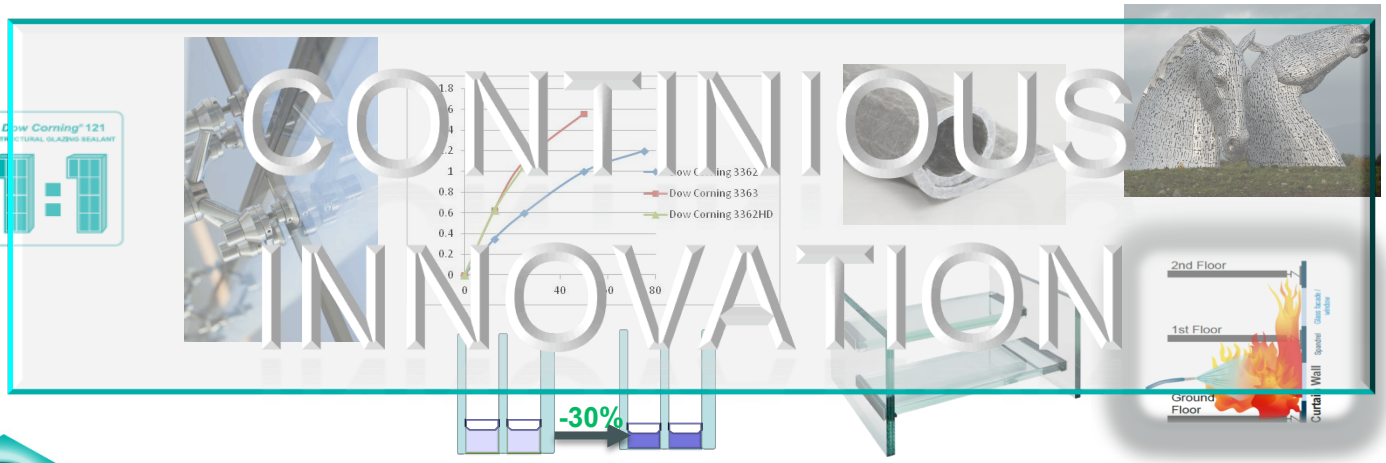
- Upload blueprints for review
- Get online calculation
- Request lab testing and see status online
- Request warranty
- Review all ongoing projects
- Look at lab testing history, types of substrates approved



Conclusion

50+ years
SILICONE STRUCTURAL GLAZING

PROVEN PERFORMANCE



Dow Corning Quality Bond™

coal

DOW CORNING ™

DOW CORNING

Thank You