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# Super Spacer®

*A Part of Something Bigger℠*

# ALWAYS PRESENT IN THE WORLD'S MOST PRESTIGIOUS BUILDINGS

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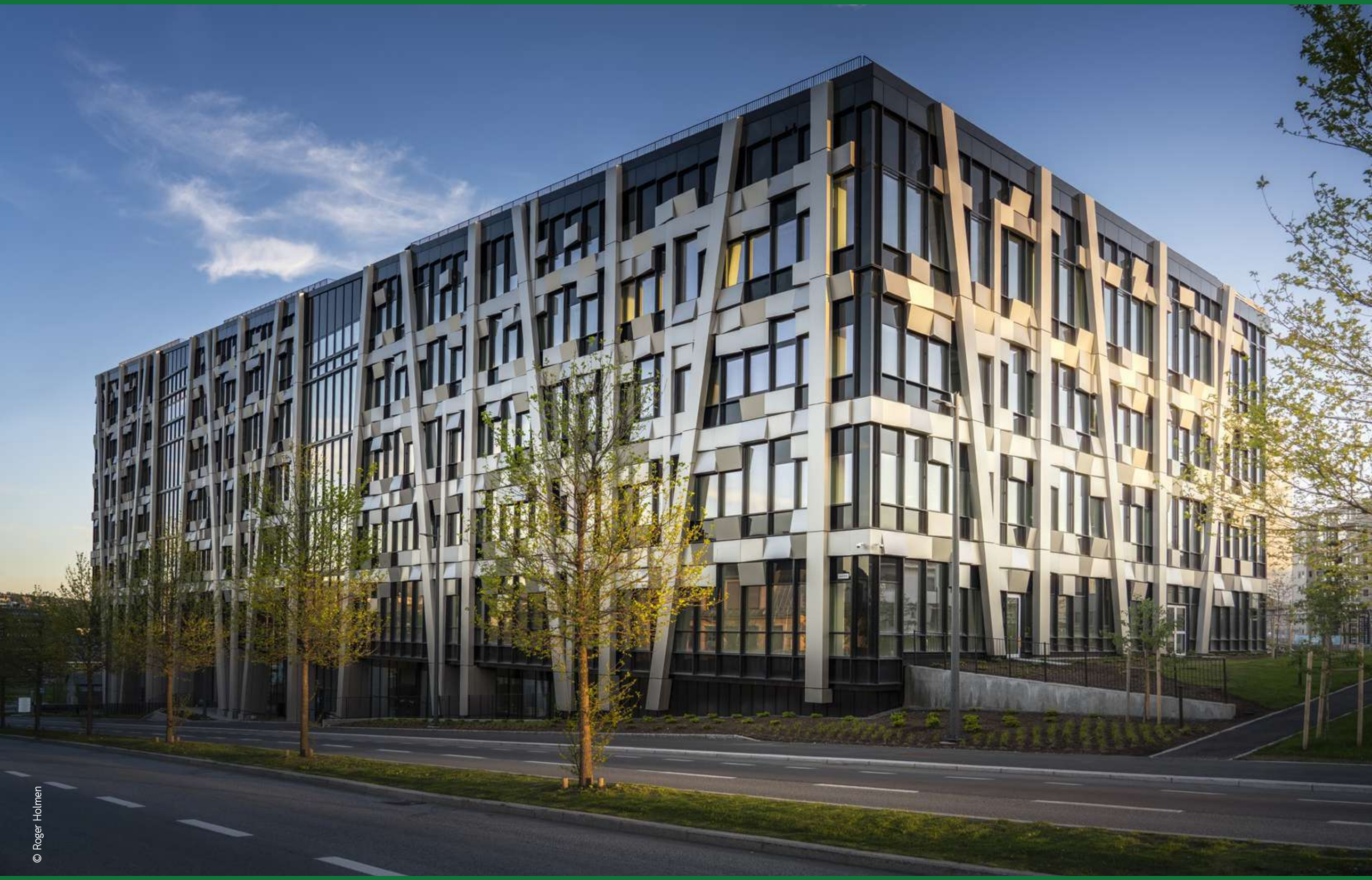

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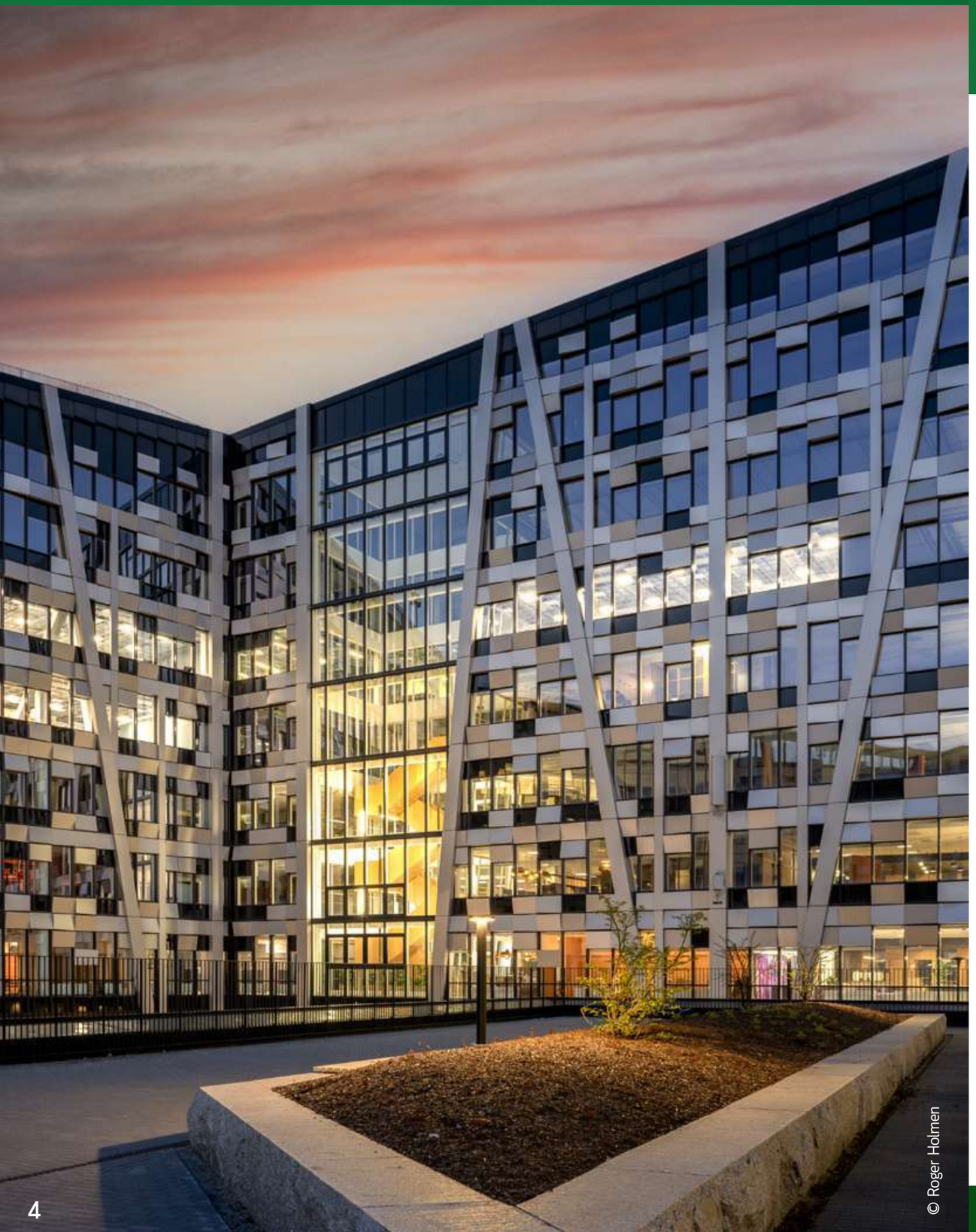

© Roger Holmen

# « ØKERN PORTAL » OSLO

**Architect: Dark Arkitekter | Facade construction: H-fasader | Glass manufacturer: Glaseksperten A/S**

**Sustainable facade made of recycled aluminium**

This flagship project houses offices, restaurants, hotels and leisure facilities. Because of the 14,600m² facade made of recycled aluminium, it is architecturally exemplary. WICTEC EL evo as the main facade and Sapa 4150 for the lower two sustainable facade systems from the aluminium specialist Hydro were installed.

12 glass structures were produced in sizes up to 1,200 x 3,000mm. Super Spacer® T-Spacer™ Premium spacer bars of different widths were automatically changed during production to ensure uniform thickness.

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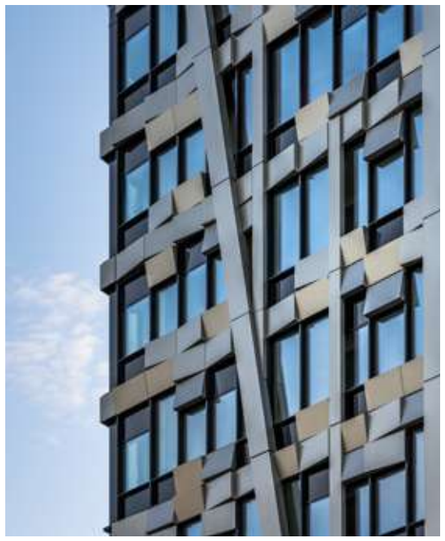


**Facts and figures**

**3,000 m² Triple glazing with Super Spacer® T-Spacer™ Premium**

The first two floors face six different directions. The insulating glass manufacturer Glaseksperten A/S customised the insulating glass to meet the different requirements for sound insulation, thermal insulation, safety and space utilisation.

**Facts and figures**

**5.000 m² of curved insulating glass with Super Spacer® TriSeal™ Premium Plus**

More than 500 spherically curved insulating glass facade elements were installed, mainly in the hotel and backstage areas

## « ELBPHILHARMONIE » HAMBURG

**Architects: Herzog & de Meuron | Facade construction: Josef Gartner | Glass bender: SunGlass**

**Visible from afar like a sparkling crystal**

The architects envisioned the concert hall and adjoining hotel and residential area as “slit, modelled and cut open” to create a connection between the inside and the outside.

Gill-shaped hatches can be found in the insulated facade area in front of the hotel. They are formed by a curved side edge directly adjacent to a flat insulating glass unit. Ventilation sashes close these reveal areas.


VOCO

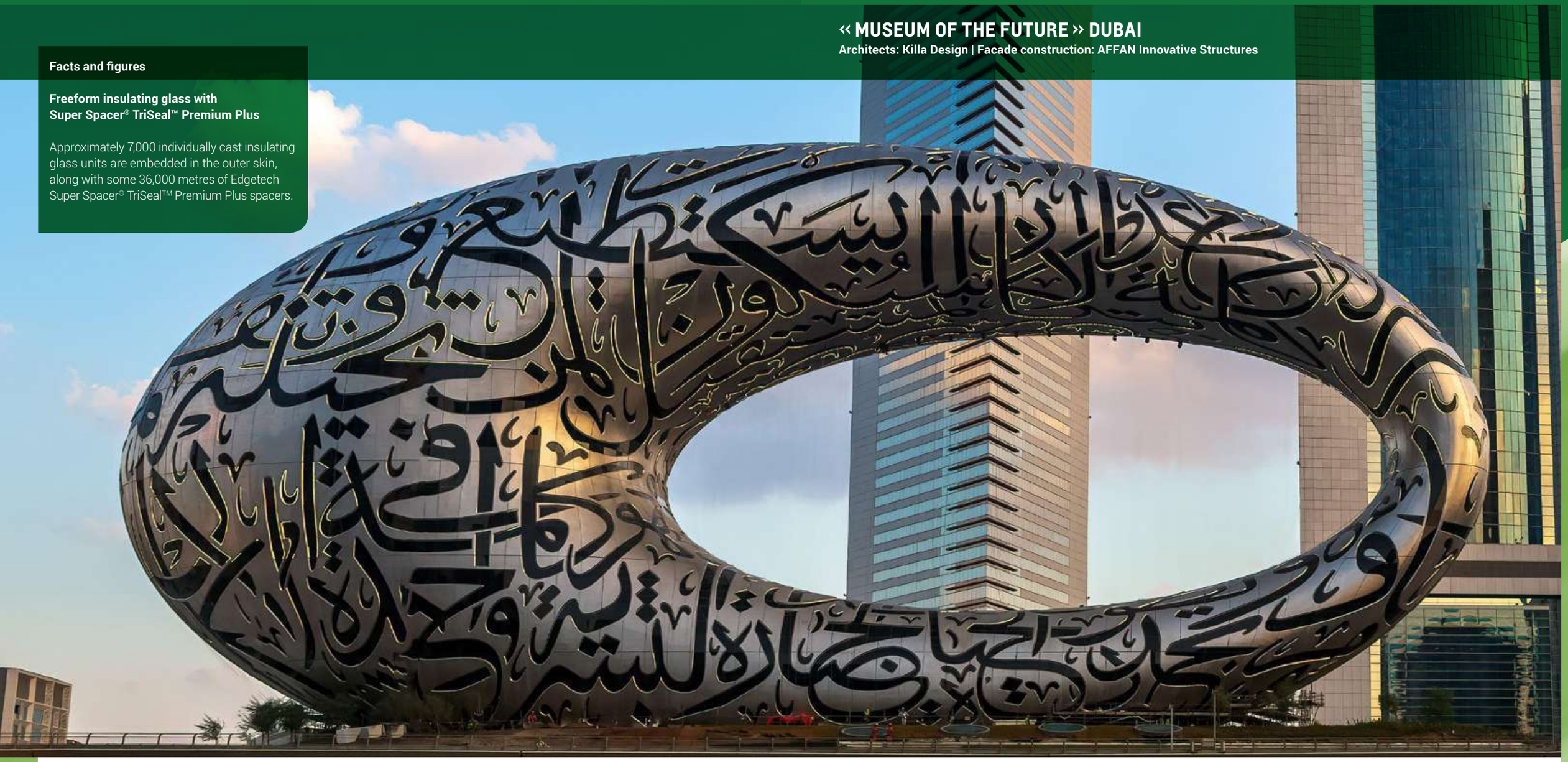
## « MUSEUM OF THE FUTURE » DUBAI

**Architects: Killa Design | Facade construction: AFFAN Innovative Structures**

**Facts and figures**

**Freeform insulating glass with Super Spacer® TriSeal™ Premium Plus**

Approximately 7,000 individually cast insulating glass units are embedded in the outer skin, along with some 36,000 metres of Edgetech Super Spacer® TriSeal™ Premium Plus spacers.



**Curved windows create calligraphic ornaments**

Many experts consider the Museum of the Future to be the most complex building in the world. The torus-shaped building with its striking opening was designed by Shaun Killa of Killa Design. The facade made of fibre-reinforced stainless steel, is pierced by precision-made insulating glass panels, giving it a unique calligraphic ornamentation.

Thanks to the flexible material of the Super Spacer®, the facade designers were able to push the limits of what was technologically feasible - an impossibility with rigid spacers.


# « TWO BRYANT PARK » NEW YORK

**Architects: MdeAS | Facade construction: W&W Glass | Glass refiner: AGC Interpane**

**Crystal clear structural glazing facade**

Based on a design by the New York office MdeAS, the former HBO headquarters on the corner of 1100 Avenue of the Americas (formerly 6th Avenue) and 42nd Street was converted into an elegant glass cube. Originally built in 1906 in the Beaux-Arts style, the building was extended in several stages from six to 15 storeys. In 1984, Kohn Pedersen Fox had already completely restructured the building and clad it with a curtain wall made of dark green glass and aluminium.

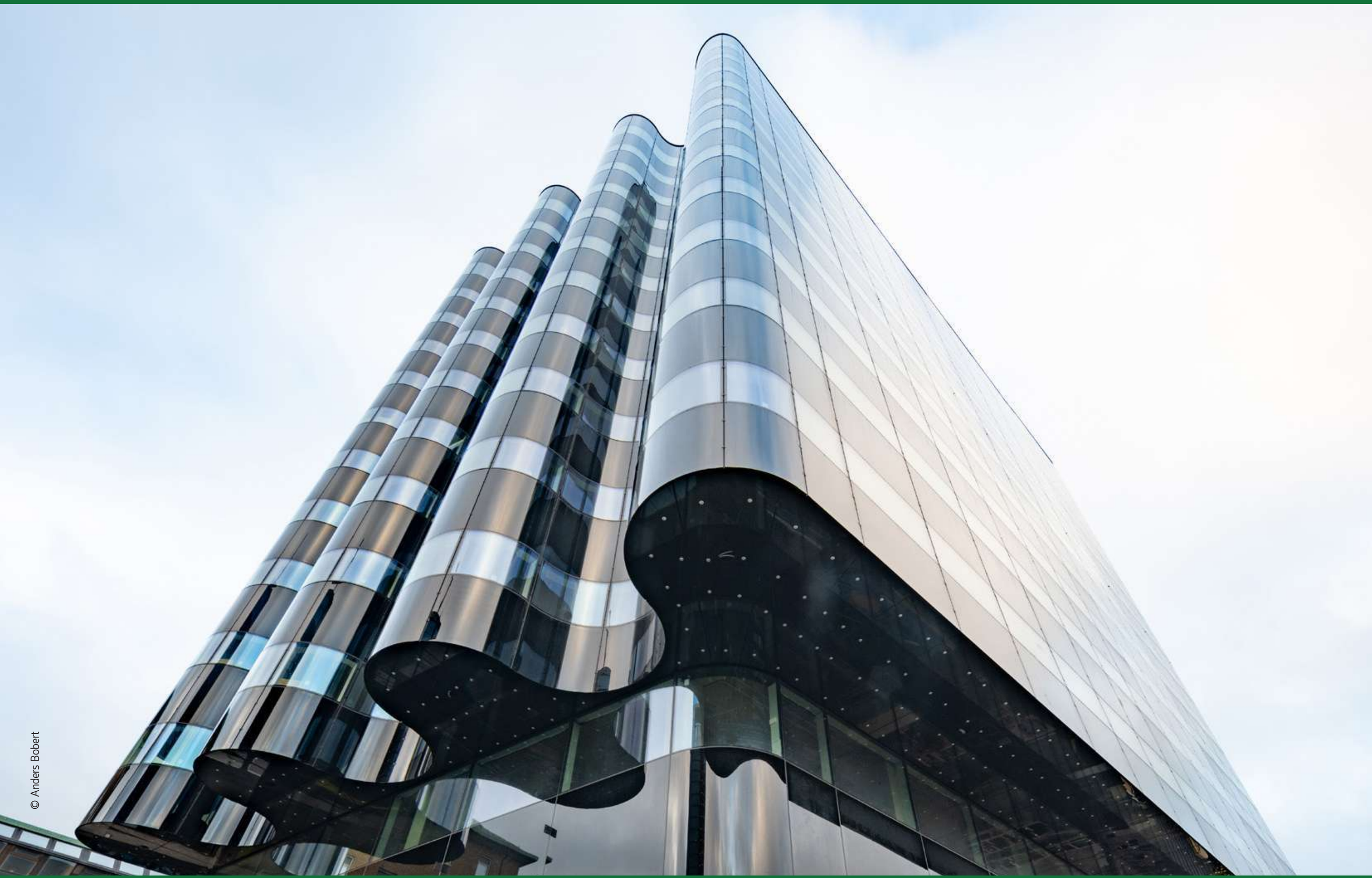
Colour-neutral solar control glass did not exist at that time. AGC INTERPANE first introduced this as ipasol natura as a world premiere in 1995. ipasol Platin 46/31, a highly selective "descendant" with high daylight transmission, was used in the new all-glass facades.


**Facts and figures**

**9.000 m² of insulating glass with Super Spacer® T-Spacer™ SG**

In total, AGC INTERPANE produced 450 tonnes of insulating glass units in two different versions.

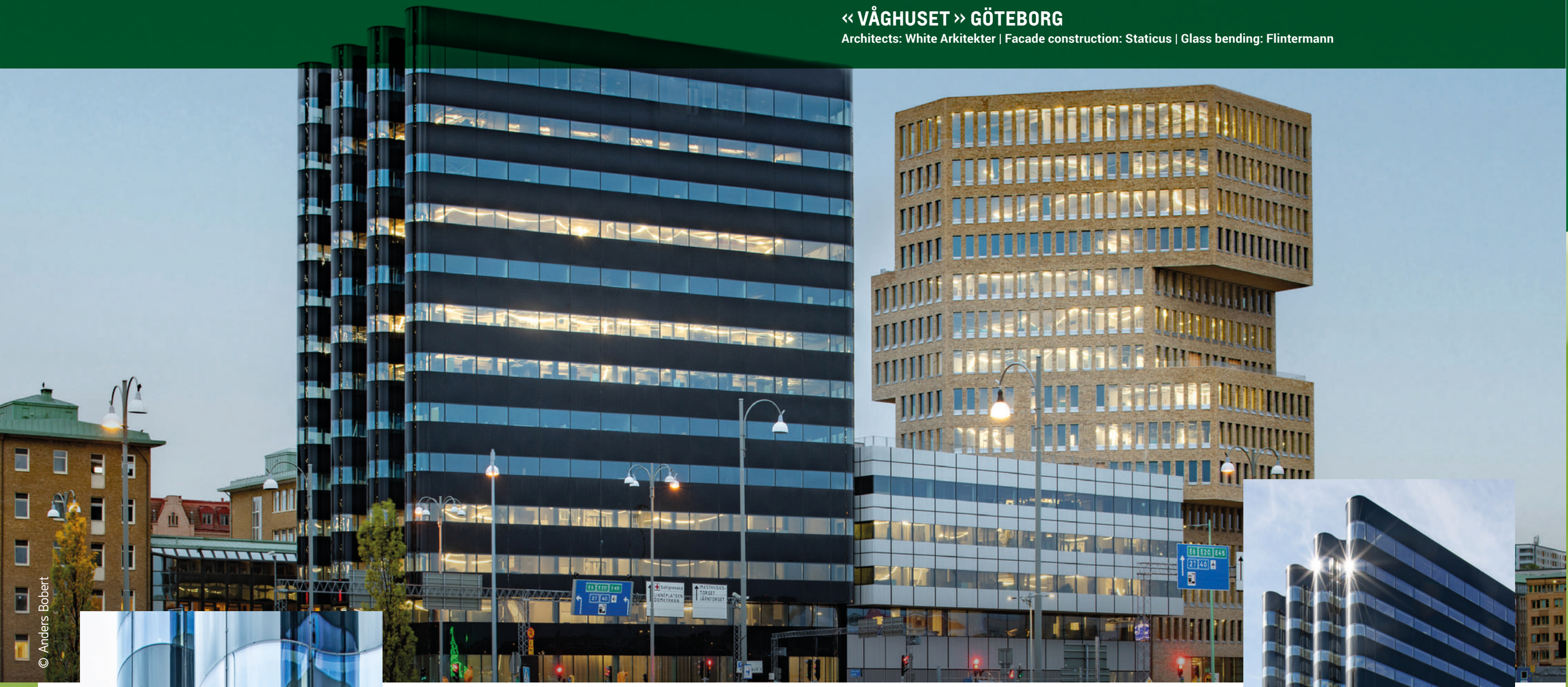
The glass units are fitted with a light grey Super Spacer® T-Spacer™ SG spacer bar and sealed with grey silicone.



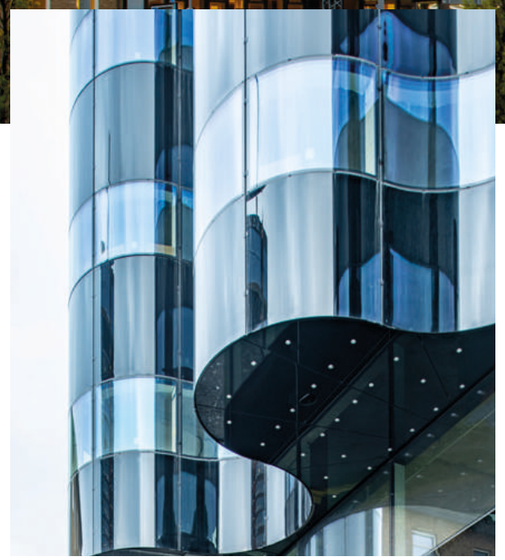
© Anders Bobert

# « VÅGHUSET » GÖTEBORG

**Architects: White Arkitekter | Facade construction: Staticus | Glass bending: Flintermann**







**Sustainability was the driving force behind the facade design**

The facade of the BREEAM-certified office and commercial building is an impressive demonstration of how glass can be used as a creative design tool while meeting energy targets. The combination of WICTEC EL evo for the unitised system and 50SG for the mullion-transom system creates the appearance of a homogeneous, glass-flush structural glazing facade.

The curved insulating glass units in the facade have a radius of 1580mm for the convex elements and 1561mm for the concave elements. Perimeter lighting is integrated on all 13 floors to highlight the shape of the building in the evening and during the winter months.

**Facts and figures**

**300 curved insulating glass units with Super Spacer® TriSeal™ Flex**

The highly selective glass of the insulating glass units allows 60% of natural daylight but only 29% of solar heat to enter the rooms.

When manually installed, the flexible spacer bar can follow the curvature of the cylindrically shaped glass precisely.

## « AUDEMARS PIGUET MUSEUM » LE BRASSUS

**Architects: Bjarke Ingels Group | Facade construction: FRENER + REIFER | Glass bending: SFL Glastechnik**

© Giovanni Galanello

**Facts and figures**

**101 curved trapezoidal insulating glass units with Super Spacer® TriSeal™ Flex**

The sizes of the insulating glass units range from 2.4m x 1.5m to 2.4m x 5.5m. Each unit is unique because the top and bottom edges follow the natural contours of the terrain. Super Spacer® TriSeal™ Flex in black was used as the spacer.

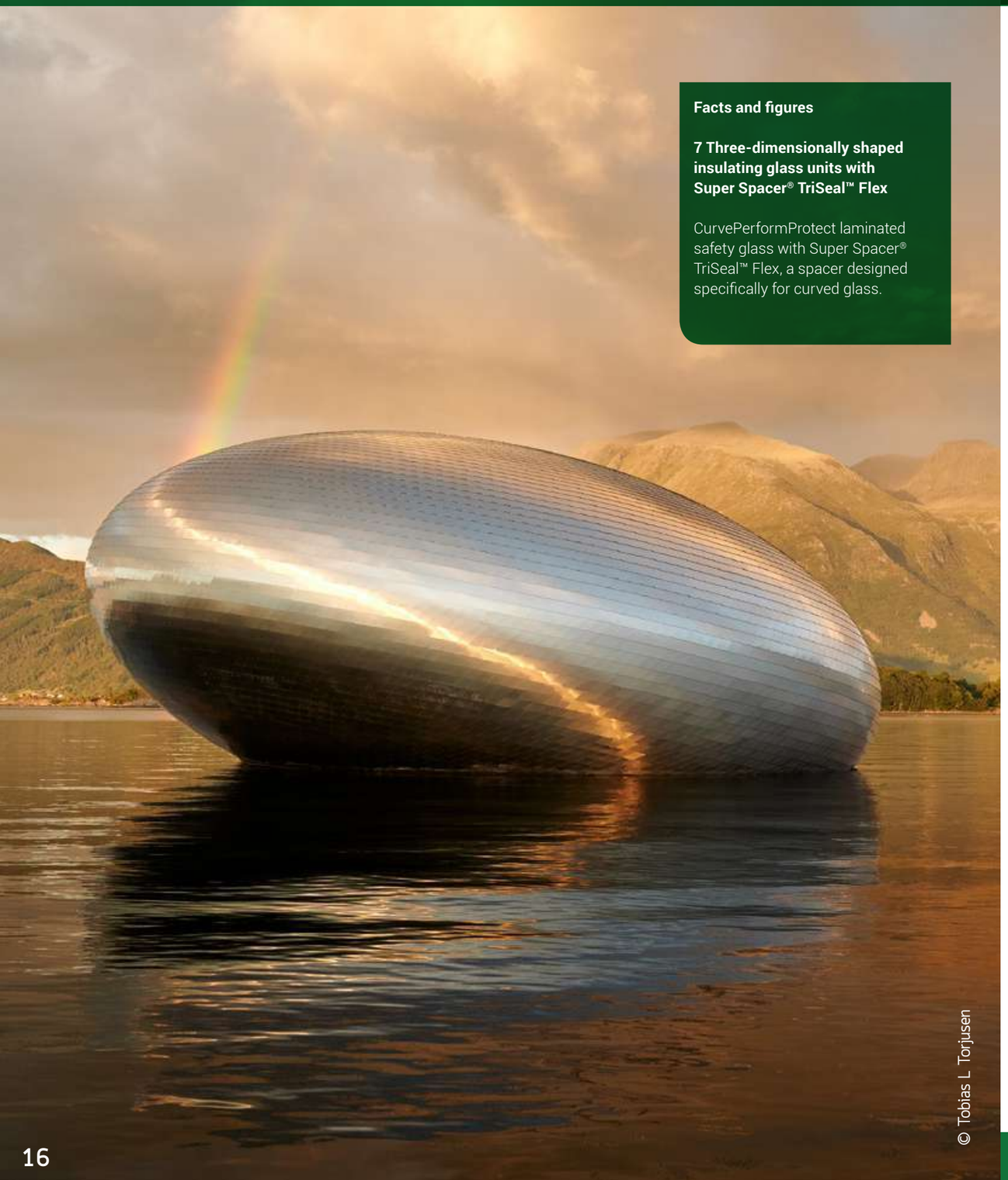
**Structural glazing at the limits of what is possible**

A glass double helix, which nestles into the landscape like a gigantic watch spring and is connected to the historic building where Audemars Piguet was founded in 1875, forms the heart of the Musée Atelier Audemars Piguet.

The Pavilion takes the concept of structural glazing to an unprecedented technological level. Without additional supports or stiffeners, the glass facade elements carry the loads. To achieve this, the insulating glass units are sealed at the top and bottom with a high-modulus silicone sealant in custom-made steel holders. Injection mortar prevents contact between the glass edge and the steel.

# « SALMON'S EYE » ROSENDAL

**Architects: Kvorning Design | Glass bending: vandaglas DÖRING**



© Tobias L Torjusen

**Facts and figures**

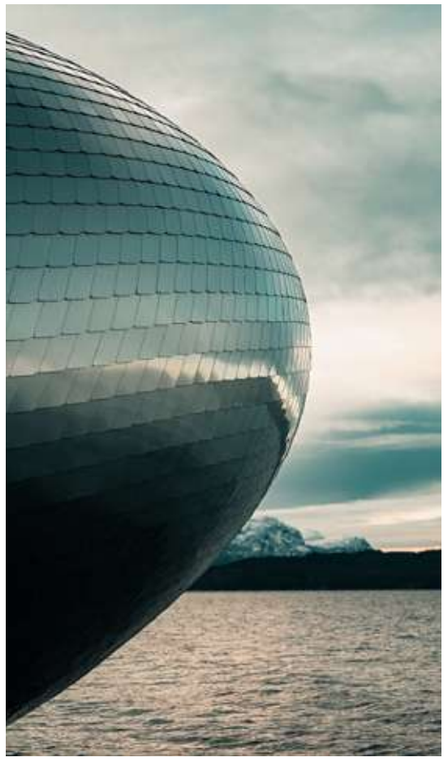
**7 Three-dimensionally shaped insulating glass units with Super Spacer® TriSeal™ Flex**

CurvePerformProtect laminated safety glass with Super Spacer® TriSeal™ Flex, a spacer designed specifically for curved glass.

**Organic design in harmony with beautiful nature**

The "Salmon Eye" in Norway's Hardangerfjord is dedicated to the theme of "sustainable seafood" and is one of the largest floating art installations in the world. The double-curved, ellipsoidal shape is modelled on a salmon's eye, and the outer skin of 9,250 stainless steel plates mimics the silvery shimmer of fish skin.

Despite its weight of 1,256 tonnes, the floating pavilion designed by Kvorning Design looks elegant and light. For the outer panes, vandaglas DÖRING supplied seven three-dimensionally formed double insulating glass elements for the outer panes, resulting in a total arch length of approximately 16.6 metres.



# « KISTEFOS ART MUSEUM » OSLO

**Architects: Bjarke Ingels Group | Glass bender: vandaglas DÖRING**

© Dmitry Tkachenko

**The supreme discipline of glass bending: three-dimensional freeform insulating glass**

Not far from Oslo, masterpieces by Yayoi Kusama, Fernando Botero and Olafur Eliasson await you in the grounds of the Kistefos Norwegian forest landscape.

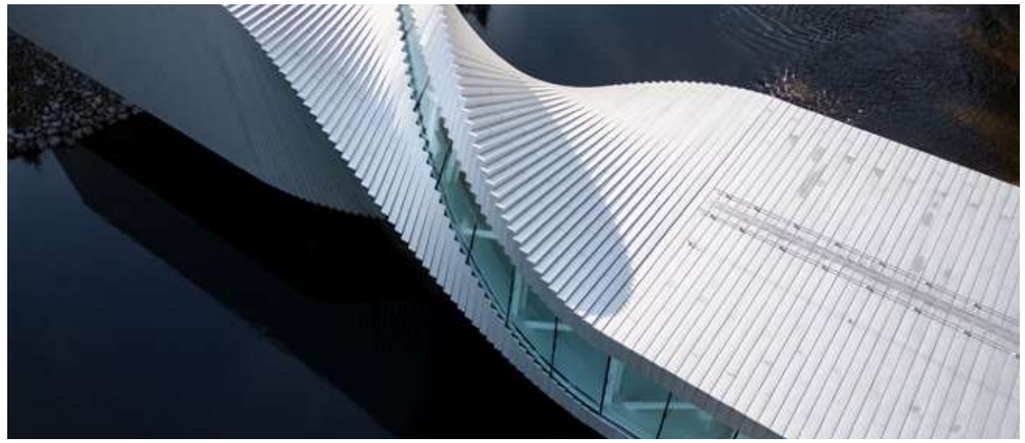
"The Twist" completes the circuit of the sculpture park above the Randselva river. The spectacular 90-degree twist turns the gallery itself into a sculpture.

**Facts and figures**

**10 freeform insulating glass units with Super Spacer® TriSeal™**

For the structural glazing facade, vandaglas DÖRING supplied ten quadruple-glazed units with an edge structure of 55.04mm.

The largest element measures 5.2 × 2.5 m and weighs an impressive 1.2 tonnes.



© Takuji Shimura

© Takuji Shimura

**Facts and figures**

**Concave and convex curved insulating glass units with Super Spacer® TriSeal™ Premium Plus**

The asymmetric layer structure of the insulating glass for the rounded corners of the building consists of an external laminated glass with COOL-LITE® XTREME 70/33 coating on the inside, 16mm Super Spacer Triseal™ Premium Plus Black as a warm edge and an 8mm float glass.

## « THE CURVE » SAINT-DENIS

**Architects: ChartierDalix | Facade construction: Metal Yapi | Glass bending: vandaglas DÖRING**

**Flat and curved panes form an optical unit**

In the town centre of Saint-Denis, you can discover one of Europe's largest timber-framed projects. The offices are flooded with natural light thanks to floor-to-ceiling windows with a depth of 1,000 to 2,000mm and a height of 3,285mm.

In order to find the ideal compromise between comfort, aesthetics and energy efficiency, an extremely transparent and highly selective solar control glass was chosen.


© Michael Young

# « NORDSTROM FLAGSHIP STORE » NEW YORK

**Architects: James Carpenter Design Associates | Glass bender: Cricursa**

**Facts and figures**

**254 curved insulating glass units with Super Spacer® TriSeal™ Flex**

In the facade of the Nordstrom flagship store, located in the podium of New York's Central Park Tower, glass elements up to 6m high form the individual floors without any visible vertical connection.

© Michael Young

**Corrugated insulating glass without vertical supports**

James Carpenter Design Associates is responsible for the design of the 45m wide and 38m high facade at the corner of Broadway and 57th Street.

The 4-fold laminated glass for the facade was produced with narrow radii and ceramic printing using the gravity bending process. The cylindrical bent elements provide load-bearing functions to avoid the need for columns or vertical support beams in the facade construction. The edge bond is elastic due to the flexible spacer, the spacer does not absorb design-related climatic loads and does not place stresses on the edge bond. A lateral sliding joint in the curved profiles provides additional clearance for high loads.

© Iwan Baan

## « QATAR NATIONAL LIBRARY » DOHA

**Architects: OMA | Glasbieger: Cricursa**

© Iwan Baan

**All glass facade without metal construction brings advantages in desert climate**

The glass of the undulating facade is omega-shaped, inspired by the idea of drying sheets of paper. As if the corners of a box had been folded up, the facades form the shape of a diamond. They filter the sunlight and illuminate the library with diffuse, glare-free daylight. A white aluminium ceiling reflects the light downwards into the room.

In order to reduce the radiation transmission, a grid of 3mm large metallic points with exactly 6mm distance from each other was burned into the glazing.

The absence of metallic elements in the glass facade has a decisive climatic advantage: potential thermal bridges that conduct heat into the building interior and could weaken the insulating effect of gas layer and warm edge in the glazing are eliminated.

**Facts and figures**

**Curved insulating glass units with Super Spacer® TriSeal™**

The curved glass units, which are up to 5.5 metres high, are designed as double insulating glass units with a low-E coating and a solar control coating to filter and reflect incoming sunlight.

© Kontraframe

# « BASECAMP LYNGBY » COPENHAGUE

**Architect: Lars Gitz Architects | Glass manufacturer: Glaseksperten A/S**

**Energy efficient windows with warm edge spacers**

On the roof of the organically shaped student housing complex, a park landscape with biodiverse planting, urban gardening and an 800-meter-long path was created.

The wood-look cladding panels are made from natural volcanic rock and recycled rock wool and can be returned to the circular flow of materials. This makes the facade one of the pillars of the sustainability concept, which has been awarded a high BREEAM rating. The green roof with photovoltaic panels provides thermal insulation, energy and natural air conditioning. Collected rainwater is returned to the natural water cycle.

The glass structures change according to the direction of the compass, depending on the heat input and light incidence. Solar control glass, thermal insulation glass or clear glass with different coatings and glass thicknesses were installed. Super Spacer® T-Spacer™ Premium Plus in various widths was used as the warm edge spacer system.

© Kontraframe

**Facts and figures**

**4,000 insulating glass units with Super Spacer® T-Spacer™ Premium Plus**

The aluminium windows with triple glazing measuring up to 4.011 x 1.127 metres are part of the overall ecological concept, because the floor-to-ceiling glazing allows as much day-light as possible into the rooms even in winter.


Your Ad Here
© Michael Young

© Michael Young

**Facts and figures**

**25,000m² insulating glass with Super Spacer® T-Spacer™ SG**

Around 2,000 glass units in the format of 6 x 3.2m, equipped with 20mm Super Spacer® T-Spacer™ SG, AGC INTERPANE delivered to North America.

# « 660 5TH AVENUE » NEW YORK

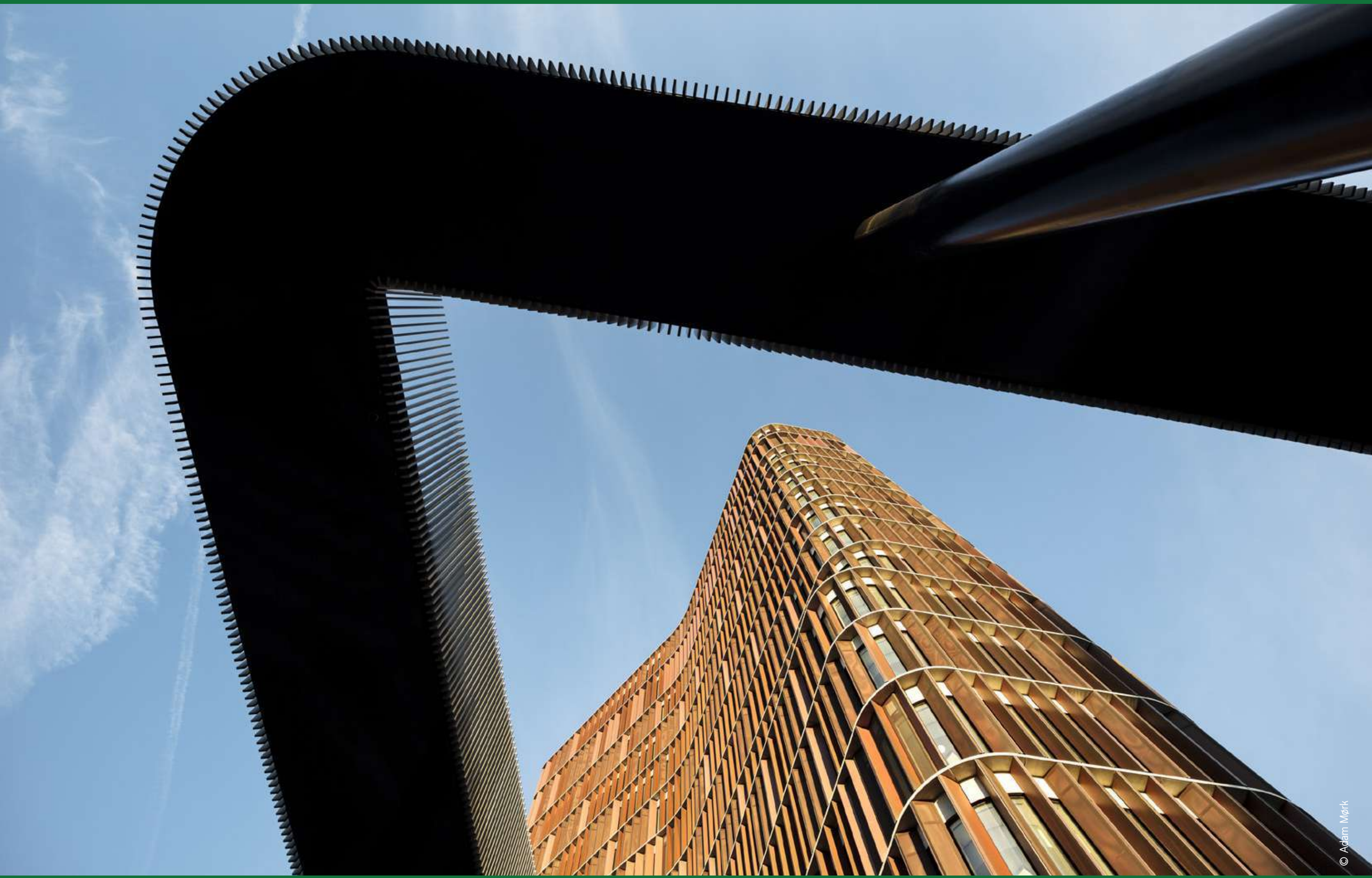
**Architects: Kohn Pedersen Fox | Glass processor: AGC INTERPANE**

**Glazed horizontally instead of vertically**

A glass facade with floor-to-ceiling horizontal insulating glass panels replaces the previous non-thermal facade of embossed aluminium.

This has almost tripled the amount of glass in the facade. The existing building had a grid size of 5.8 metres wide and 3.2 metres high. This allowed the panes to be installed horizontally.

This view of the facade makes the building unique among the other glass facades in New York.



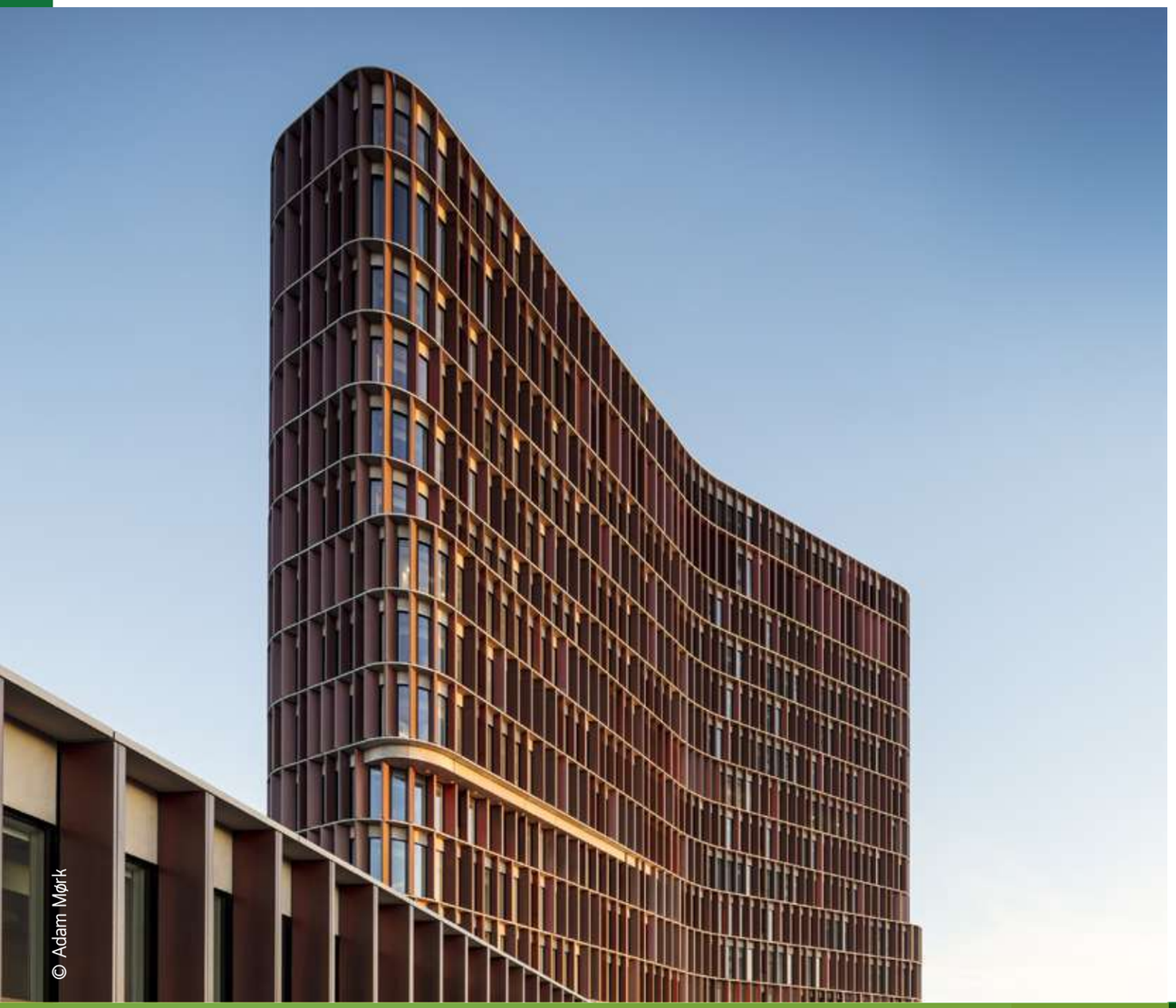
# « MAERSK TOWER » COPENHAGUE

**Architects: C.F. Møller | Facade construction: Waagner Biro | Glass bending: vandaglas DÖRING**

**Creative use of copper**

The Maersk Tower is not only a modern landmark in Copenhagen, but the three-winged, gently undulating tower is also the most energy-efficient laboratory building in Denmark.

In front of the aluminium unitised facade, with its floor-to-ceiling triple insulating glass units and panels, is a relief-like structure of glass-fibre concrete elements and copper-clad louvres. The partially movable shutters follow the weather. When exposed to the sun, thin copper grids automatically move out of the louvres to reduce energy use, but still allow daylight into the rooms. The use of copper pays homage to the surrounding architecture, with its traditional brick facades.





**Facts and figures**

**1,200m² cylindrical insulated glass with Super Spacer® TriSeal™ Premium Plus**

For the convex and concave triple insulating glass units, a glass structure with extremely translucent, neutral diamond white glass was chosen to allow as much daylight as possible inside even in the long Scandinavian winters.

## « THE OPUS » DUBAI

**Architects: Zaha Hadid Architects | Glass manufacturer: Shennanyi**

**“The Void”: An engineering masterpiece**

For The Opus, Zaha Hadid had a vision of a cube: a building hollowed out from the inside that appears to float above the ground floor. Indeed, like an ice cube melting in the hot desert sun, “The Opus” offers an unobstructed view of Dubai’s stunning architecture from inside the building.

Below, the empty space is defined by a freeform glass roof above the multi-storey atrium. At the top of the 71-metre high building, the towers are topped by a nearly 38-metre long, elegantly curved and earthquake-resistant bridge made of curved double insulating glass, curved double aluminium frames and steel.

**Facts and figures**

**4,544 insulating glass units with Super Spacer® TriSeal™**

Each of the glass units for the dark blue glazed empty space - “The Void” - is an individually manufactured unique piece, the vast majority is also bent 2-fold insulating glass with irregular shapes.

© Erich Reisman

## « DAS HOHO » VIENNA

**Architects: Rüdiger Lainer and Partners| Glass manufacturer: Petschenig glastec**

**The best of both worlds:**
**wood-concrete hybrid construction**

The HoHo Vienna timber tower is a pioneer in energy efficiency and resource optimisation. From the ground floor up, the building has a wood content of almost 74%, saving 2,800 tonnes of $CO_2$ compared to a similar, conventionally constructed building.

The insulating glazing scores with an outstanding Ug value of 0.5 W/m²K, and the glass edge composite with a Psi value of 0.033 W/mK. The Uw value for the whole window is 0.78 W/m2K, the total energy transmittance is 49%.

**Facts and figures**

**1,100 insulating glass units with Super Spacer® T-Spacer™ Premium Plus**

For acoustic reasons, the external pane of the triple thermal insulation glass is laminated safety glass, while the internal pane is single-pane safety glass.

Super Spacer® was applied using automated robot-controlled machinery precisely to the millimeter.


© Michael Young

# « NIKE HOUSE OF INNOVATION » NEW YORK

**Architects: CallisonRTKL| Facade construction: seele | Glass bender: Cricursa**

**A showcase front for the 21st century**

The Nike Flagship Store covers more than 68,000 square metres on the corner of 5th Avenue and 52nd Street.

A futuristic retail temple for the digital age, it needed a dynamic storefront to match its innovative interior and bold brand personality. During the day, a glass curtain wall offers passers-by a vivid 3D texture, while at night it shimmers with internal lighting and diagonally milled glazing in a rainbow of colors.

The flexible warm edge spacer perfectly adapts to the unique size and shape of the design, providing a seamless aesthetic.

**Facts and figures**

**75 curved, partly milled insulating glass units with Super Spacer® TriSeal™**

The double-curved, thermally insulating glass elements for the new cladding of the 6-storey facade are outstanding in terms of complexity, £glass competence and technical capabilities.

© Vdarulis

**Facts and figures**

**Curved insulating glass with Super Spacer® TriSeal™ Premium Plus**

For the curved edges of the facade, Flintermann supplied the concave triple insulating glass units in 2,800 x 3,800 m format with Super Spacer® TriSeal™ Premium Plus in 16mm as spacers.

# « GREEN HALL 2 » VILNIUS

**Architects: Arrow Architects| Facade construction: KG Constructions UAB| Glass bender: Flintermann**

**Flexible spacer compensates for weather-related pumping movements**

This A-rated building is a prime example of how architecture can blend harmoniously with the environment. The curved facade follows the bend of the neighbouring Neris River, and the reflective windows mirror the landscape.

When using curved insulating glass units of this size, especially in a climate zone where it is extremely cold in winter and very hot in summer, the choice of spacer is particularly important for the durability of the edge bond. Flexible Super Spacer® compensates for weather-related pumping movements and relieves pressure on the primary seal.

# « PARKAPARTMENTS AM BELVEDERE » VIENNA

**Architects: Renzo Piano Building Workshop| Glass manufacturer: Petschenig glastec and Flintermann**

**Modern architecture in connection with nature**

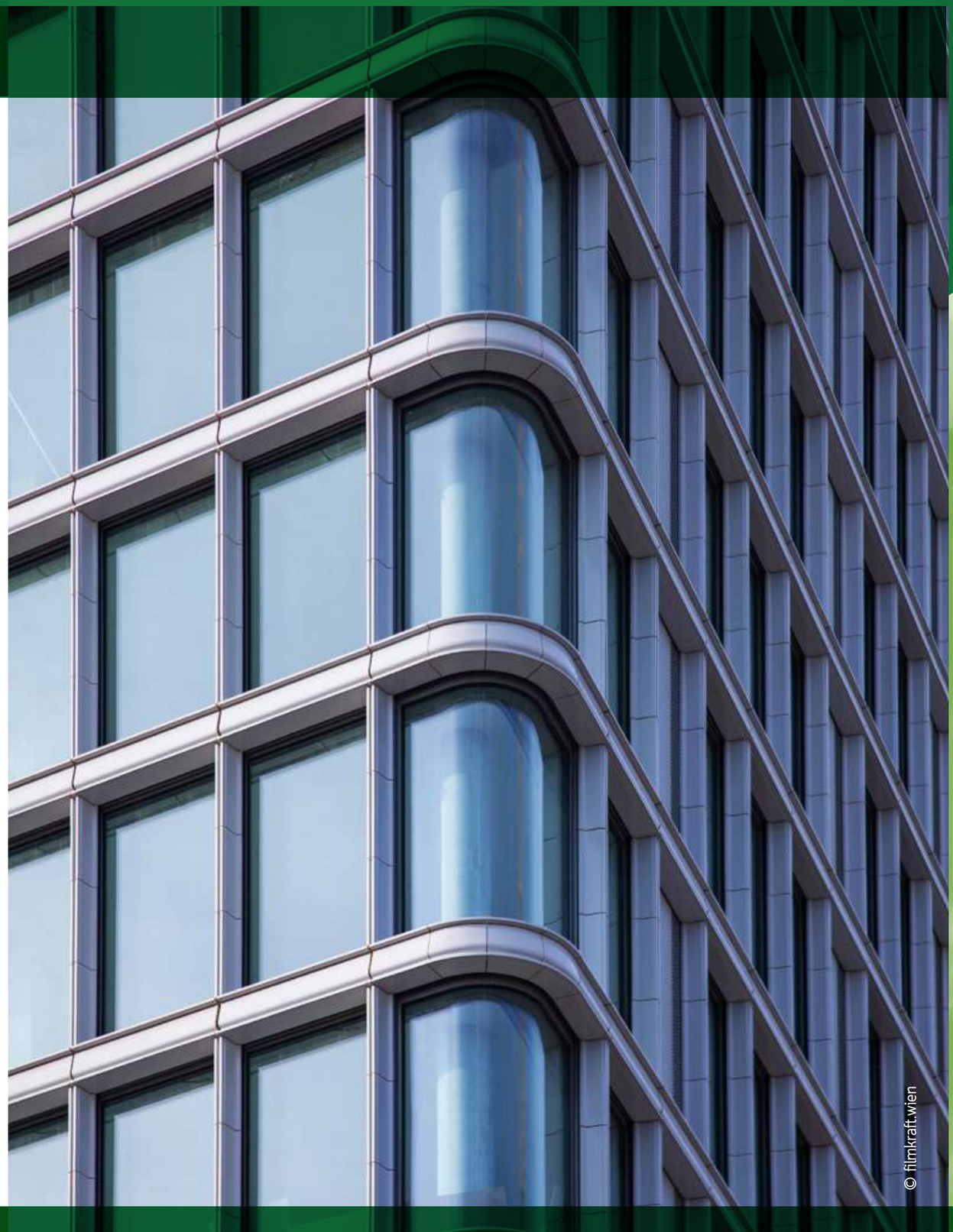
The 342 apartments and the 303-room hotel are spread across five towers with polygonal floor plans, stacked on slender pylons. Ceramic is the connecting facade material in homage to the historic brick facades of the neighbouring Vienna Arsenal.

The sophisticated pane geometry of the curved elements was a technical challenge. Five large individual panes, straight at the ends and with a central bend with a very small radius, were combined with Super Spacer® TriSeal™ Premium Plus to form triple insulating glass units.

**Facts and figures**

**15,000m² insulating glass units and curved glass with Super Spacer® TriSeal™ Premium Plus**

The 1,100 heat and sound insulating glass units and the anti-fall insulating glass units were manufactured using Super Spacer®, as were the curved units for part of the building's perimeter.



© filmkraft.wien

# « MOL CAMPUS » BUDAPEST

**Architects: Foster and Partners | Facade construction: Koltay Façades | Glass finisher/bender: AGC INTERPANE and Finiglas**

© Foster and Partners

**Lighthouse project for comfort and sustainability**

The design reflects the changing world of work. The transition of work and garden areas from the atrium to the top of the MOL Campus tower connects not only the floors but also the people. To create a smooth transition between the podium and the tower, double curved glass was used instead of approaching the curve with a facetted pane.

The very different base areas of the floors in the podium and tower also led to curved shapes. Koltay Façades specified the Super Spacer® system as the spacer for the entire facade. This was due to the curved insulating glass, which is difficult to achieve with rigid spacers.

**Facts and figures**

**14,000m² insulating glass with Super Spacer® T-Spacer™ SG and curved panes with Super Spacer® TriSeal™**

AGC Interpane supplied the flat, double and triple insulating glazing. Finiglas manufactured cylindrical and multi-curved glass panels with extreme curvature.


© Groß & Partner

# « FOUR » FRANKFURT

**Architects: UNStudio | Facade construction: Gartner | Glass refiner: AGC INTERPANE**

**High energy requirements for the facade**

The skyscraper ensemble plays a prominent role in the Frankfurt skyline. Despite their compactness, the four buildings have a dynamic and elegant appearance and offer a wide field of vision and high levels of daylight from many points of view. The hexagonal footprints are each rotated 90 degrees around the longitudinal axis. Vertical, full-height frames, folds and different materials within the facade give the FOUR a unique visual effect.

An identical concept for the thermal envelope required Uw values well below 1 W/m²K. To achieve this, g-values of around 0.34 were specified for the solar control glazing.

© Groß & Partner

**Facts and figures**

**24.000 m² insulating glass units with Super Spacer® T-Spacer™ SG**

AGC Interpane is supplying the internal triple glazing for the double skin facades of residential towers 2 and 3, as well as the double glazing for the mullion-transom facades of the podium, using Super Spacer® T-Spacer™ SG as a warm edge spacer.