

## Built to Last - Stainless Steel as an Architectural Material



## Introduction

Only a couple of years after the invention of stainless steels, architects started discovering its potential for building and construction - in both visible and non-visible applications. The foundations of St Paul's Cathedral in London were stabilized using stainless steel as early as 1922. The first large-scale architectural applications were in iconic buildings. The tip of the Chrysler Building in New York, installed in 1930, is the most visible to the present day. Since then, the panoply of grades and finishes has become much larger - and so has the spectrum of applications. The present publication shows just a few of the recent examples. However diverse they may be in terms of scope, purpose and product used, they have one thing in common: they are part of an architecture that is made to last.



*Cover photo: Ely and Edith Broad Art Museum, Lansing, MI, USA.; architect: Zaha Hadid; photo by Justin Maconochie*

*Stainless Steel is a material that combines with any style and material. Hotel Fouquet's Barrière, Paris; arch.: Edouard François; photo by Thomas Pauly*

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## Ely and Edith Broad Art Museum, Lansing, Michigan, USA

### Architects: Zaha Hadid, London

In the selection process, mock-ups of various materials competed with one another and stainless steel came out best. A proprietary directional finish called Angel Hair® produced exactly the degree of reflectivity that the architect requested. Precisely formed cleats were another requirement. Because of its formability, stainless steel could be bent to a radius even smaller than the material thickness of 1.5 mm. To this end, V-shaped grooves were applied to the rear side of the sheet before bending. This operation was executed with a precision of 0.005 mm. Grade 316L was preferred because in winter de-icing salt is used on adjacent roads and footpaths and chloride-containing projections may occur.



Photos by Justin Maconochie



### Details

<b>Environment:</b>	Mild urban
<b>Fabrication process:</b>	V-cutting, bending, welding
<b>Grade and finish:</b>	316L, Angel Hair®
<b>Material thickness:</b>	1.5 mm
<b>Date of completion:</b>	2012
<b>Manufacturing company and material supplier:</b>	A. Zahner Company, Kansas City, Missouri



## Art Science Museum at Marina Bay Sands, Singapore

### Architects: Safdie Architects, Boston

Located in the centre of the business district, the Art Science Museum is reminiscent of a lotus flower. Based on a round centrepiece, it extends into eleven "fingers" which house a total of 21 different exhibition spaces. The outer shell is a composite design made from glass fibre-reinforced cement for the rounded surfaces of the "petals" and stainless steel for the reflective sides.

### Details

<b>Environment:</b>	Tropical marine
<b>Fabrication process:</b>	Brake pressing
<b>Grade and finish:</b>	SUS316
<b>Weight:</b>	17 tons
<b>Date of completion:</b>	2011
<b>Manufacturing company and material supplier:</b>	Nisshin Steel



*Fondation Louis Vuitton, Paris. Photo by Daniel Rodet.*

## Fondation Louis Vuitton, Paris, France

**Architects:** Frank Gehry, Los Angeles and STUDIOS Architecture, San Francisco and Paris

**Structural Engineering:** RFR, T/E/S/S, Paris

A ghost ship with billowing sails was the idea that the architect had in mind when conceiving a unique structure for the art collection of French tycoon Bernard Arnaud. Twelve glass sails span over the “Iceberg”, the central volume housing the exhibition. A combined wood and steel design was selected for the primary structure of the sails. 540 duplex stainless steel inserts join the wooden elements with the steel components, which include 430 geometrically complex nodes made from composite carbon steel and duplex stainless steel plate 120 mm thick. The secondary structure, which holds the customized glazed elements, is fully made from duplex stainless steel type 2205, which was selected for its mechanical properties. Compared with an equivalent structure in 316, weight was reduced by about 30%. The structure involves 10 km of curved mullions, 5 km of transoms and 2 km of gutters for rainwater drainage made from 20 mm thick duplex stainless steel. Besides 9,000 “ears” for connectors and hundreds of securing fasteners, also tension rods for the structure and rails for the suspended cleaning cradles were all made from 2205 duplex stainless steel. The interior water piping was fully designed in type 316L stainless steel. (Information courtesy of IMOA)

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	High-pressure water jet cutting, welding, milling
<b>Grade and finish:</b>	Duplex 2205 plate and rod, 220-grit directional polish (structural parts): 316L (interior water piping)
<b>Material thickness:</b>	various
<b>Weight:</b>	1,500 tons
<b>Date of completion:</b>	2014
<b>Manufacturing company:</b>	VINCI Construction, Rueil-Malmaison (France) and Eiffage Construction Métallique, Colombes (France)
<b>Material supplier:</b>	ThyssenKrupp Materials France

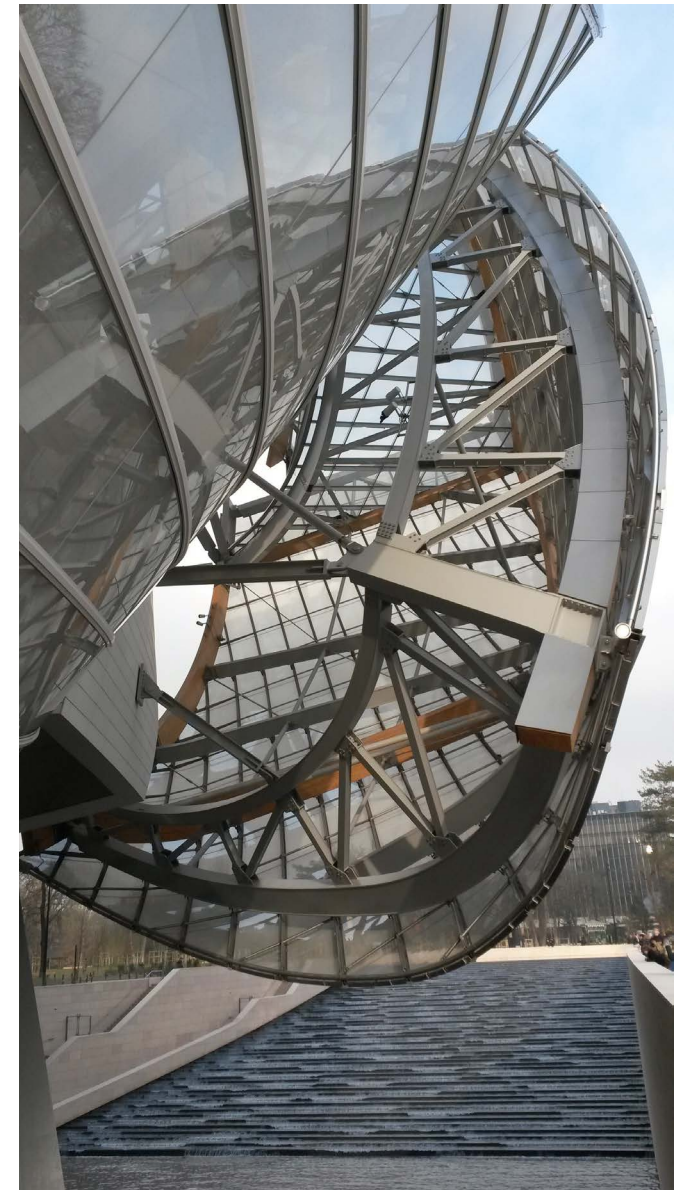


Photo by Thomas Pauly.

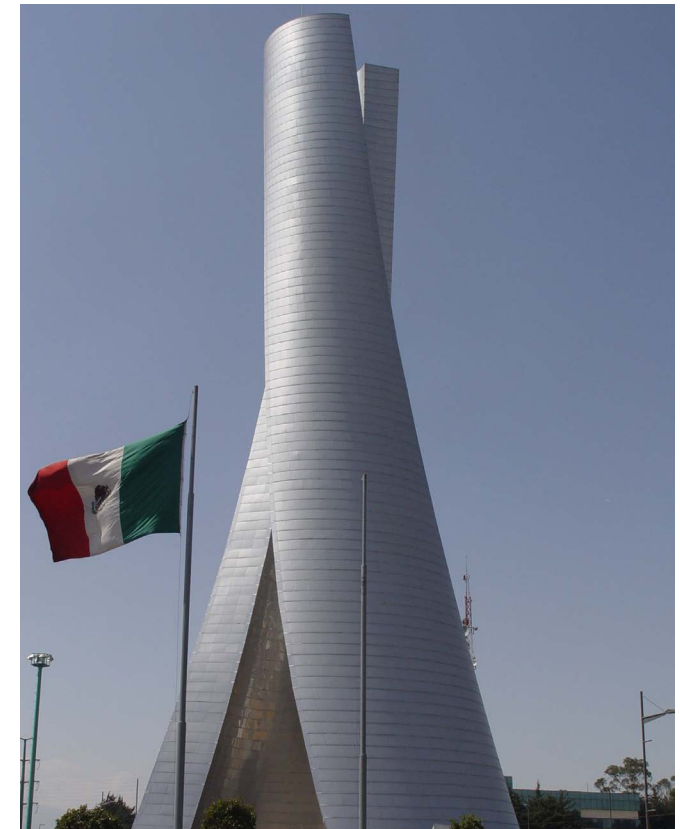
## Bicentenary Towers, Toluca, Mexico

**Architect: Guillermo Maya López**

The monument was erected in commemoration of the bicentenary of Mexican independence. The intertwining halves were given a complex three-dimensional curvature, which required a material that was exceptionally formable - also in the joints. At night, twenty spotlights illuminate the structure and create the impression that the sculptural monument is itself shining from within - an effect in which the reflective surface is instrumental.



*Photo: Fernando Correa Carrillo*



*Photo: Ulises Silva Cruz*

### Details

<b>Environment:</b>	Urban
<b>Grade and finish:</b>	304L, 2B
<b>Date of completion:</b>	2009
<b>Manufacturing company:</b>	Metal Comunicaciones, Ocoyacac, Mexico



## Art Gallery of Alberta, Edmonton, Canada

### Architects: Randall Stout Architects, Los Angeles

This museum, designed by the late Randall Stout, is a piece of sculpture in itself. The fabricator made the forms and shapes using his proprietary “ZEPP” technology driven by digital fabrication techniques. The panels were pre-assembled before the custom finish of the stainless steel was applied. Internal stainless steel gutters and downspouts were concealed within the forms. The ribbons of stainless steel move inside and outside the building at once forming the walls of the stairways then wrapping to make the ceiling of the entry and venturing outside to shade people on the walk.



Photo courtesy of Randall Stout Architects

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Curving, shaping, welding and forming
<b>Grade and finish:</b>	316, proprietary directional finish (Angel Hair®)
<b>Material thickness:</b>	0.8 mm and 1 mm
<b>Date of completion:</b>	2010
<b>Manufacturing company and material supplier:</b>	A. Zahner Company, Kansas City, Missouri

## Christ of Chiapas, Copoya, Tuxla Gutiérrez, Chiapas, Mexico

**Architect: Jaime Latapí López**

The 62 metre-high statue is a multi-metal design, which involves a carbon steel primary structure, an aluminium secondary structure and a stainless steel outer skin. The stainless steel sheet is adhesively bonded to the supports to avoid galvanic corrosion. The inner surface is outlined in gold to convey the idea of "Christ of Light".



Photos by Ulises Silva Cruz



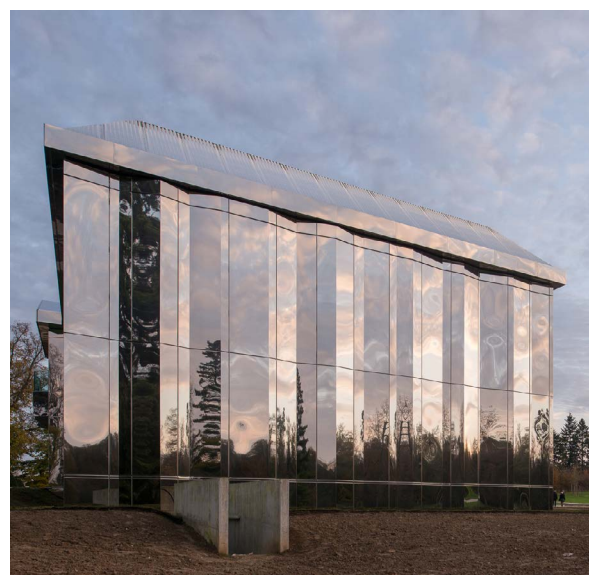
### Details

<b>Environment:</b>	Rural
<b>Grade and finish:</b>	304 P3
<b>Total weight of the stainless steel used in the project:</b>	46 tons
<b>Date of completion:</b>	2011
<b>Manufacturing company:</b>	Obras de Arte, Inventos, Sueños SA de CV, Tlalnepantla, Mexico
<b>Material supplier:</b>	Outokumpu Mexinox

## Fonds Régional d'Art Contemporain (FRAC) Île-de-France, Marne et Gondoire, France

**Architects:** Bona-Lermercier architectes, Paris et Xavier Veilhan, Paris (artist) together with Alexis Bertrand, Paris (scenographer)

The castle and park of Rentilly near Paris, whose history goes back to the early 16<sup>th</sup> century, have been transformed into a centre of modern art. The architects, with the support of a well-known French artist, clad the historic building with mirror-polished stainless steel. Great care was taken to ensure maximum optical flatness in the sheet but also in the fabrication of the facade elements and their installation. Mirroring its environment, the building merges with the surrounding park.



Photos by MYRA

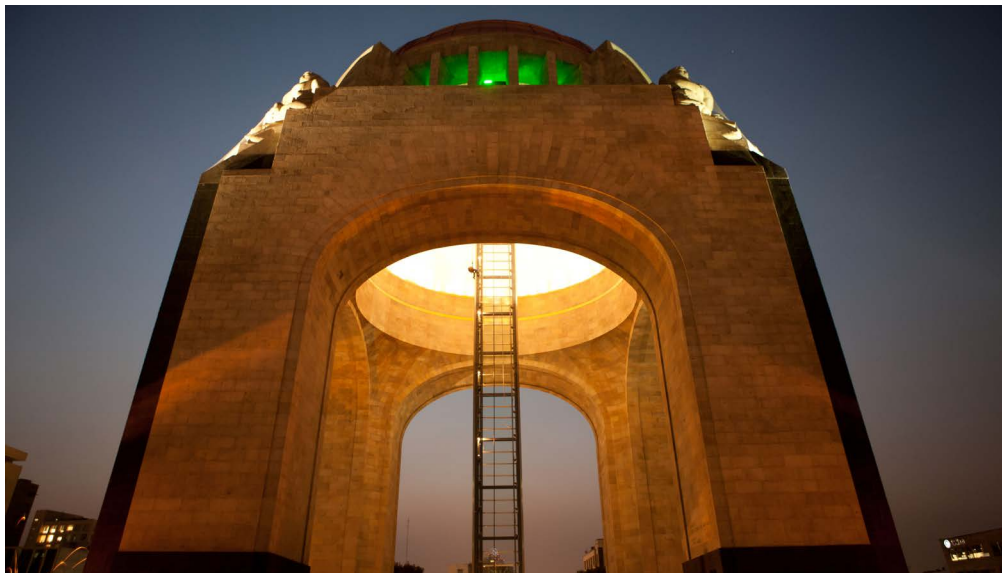
### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Brake pressing
<b>Grade and finish:</b>	304L, no. 7 directional mirror finish (Meca 7D)
<b>Material thickness:</b>	1.5 mm
<b>Weight:</b>	c. 27 t
<b>Date of completion:</b>	2014
<b>Manufacturing company:</b>	Vetisol (facade elements) together with Baudin Châteauneuf (installation)
<b>Material supplier:</b>	Aperam Services and Solutions Lusignan (MECACHIM)

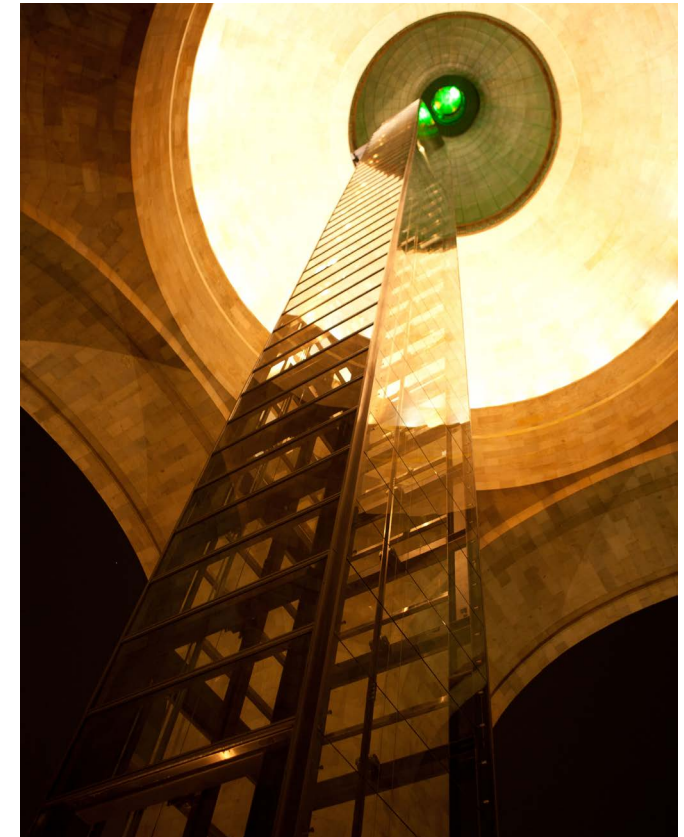
## Lifts of the Monument of the Mexican Revolution, Mexico City, Mexico

### Architect: Enrique Espinoza Fernández

Finished in 1938, the Monument of the Mexican Revolution, measuring 67 m in height, is still considered the tallest triumphal arch in the world. To facilitate access to the dome and make it more attractive for visitors to the museum underneath, a lift was added. Among the competing concepts, an elegant yet unobtrusive design was finally selected which remained essentially respectful of the symmetrical layout of the building. It involved a filigree, transparent steel-and-glass lift shaft which rises right in the centre of the square monument. The mixed material design encompasses a carbon steel load bearing structure which is clad with stainless steel. The full metal design is also beneficial from a safety point of view because it is tolerant to seismic activities. Also the ancillary structural components such as the glass holders and other fasteners and the handrails are from stainless steel.



Photos by Ricardo Espinosa



### Details

Environment:	Urban
Grade and finish:	304, P3
Total weight of the stainless steel used in the project:	4 tons
Material supplier:	Mexinox

## Haceros Inolvidables, Cuautitlán, Mexico

### Architect: Enrique Espinosa Fernández

On the occasion of the Centenary of Stainless Steel, the Mexican Stainless Steel Institute, IMINOX, launched the competition for a monument which should celebrate another centenary - that of the Mexican Army. The sculpture was given the name "Haceros Inolvidables" ("Making you unforgettable"), which sounds similar to "aceros inoxydables" ("stainless steel"). A long-lasting material symbolizes a lasting memory. The monument was fabricated in segments in the workshop to ensure maximum accuracy, transported on site and assembled there using stainless steel mechanical fasteners and adhesive bonding.



Photos: Fernando Correa Carillo (left), Ulises Silva Cruz (right)

### Details

<b>Environment:</b>	Urban
<b>Grade and finish:</b>	304 in no. 1, P3 and BA finishes
<b>Total weight of the stainless steel used in the project:</b>	7 tons
<b>Date of completion:</b>	2012
<b>Manufacturing company:</b>	Obras de Arte, Inventos, Sueños SA de CV, San Nicolás, Tlalnepantla de Baz
<b>Material supplier:</b>	Outokumpu Mexinox



Image courtesy of KPF

## Ping An Finance Center, Shenzhen, China

Architects: Kohn Pedersen Fox (KPF), New York

With a height of 599 m and over 100 office floors, the Ping An Finance Center will be the tallest building in Shenzhen. Linen-finished stainless steel was selected for its material contrast with the other visually dominant materials which are glass and stone. The reflective surface also contributes to the sustainability of the building, which is LEED gold pre-certified.

### Details

Environment:	Urban
Fabrication process:	Brake pressing
Grade and finish:	316L, 2M (Linen 25)
Material thickness:	2 mm
Weight:	1,700 t
Date of completion:	2018
Material supplier:	Outokumpu Nirosta GmbH



Photo courtesy of Benson

## One World Trade Center, New York, USA

**Architects: David Childs, Daniel Libeskind, Skidmore, Owings & Merrill, Chicago, Illinois**

Next to the site of the former Twin Towers, the One World Trade Center rises above the 9/11 memorial. For the bright accentuated edges of the chamfered structure, the architects requested a surface that should have the proven mechanical and dirt-repellent properties of patterned stainless steel while being somewhat brighter than the commercially available “Linen” finish. Based on digital technology, the supplier developed a new method which produces a true random pattern without any repetitive structures. It makes the surface effect essentially independent of the viewing angle or the angle of incident light and provides maximum consistency.

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Brake forming
<b>Grade and finish:</b>	316L, patterned (“Laser”)
<b>Material thickness:</b>	Face panel 2 mm, corrugated back pan 1 mm
<b>Weight:</b>	175 tons
<b>Date of completion:</b>	2014
<b>Manufacturing company:</b>	Benson Industries, Portland, Oregon (facade builder) together with Christan Pohl, Cologne, Germany (panel manufacturer)
<b>Material supplier:</b>	Outokumpu

## La Vela, Madrid, Spain

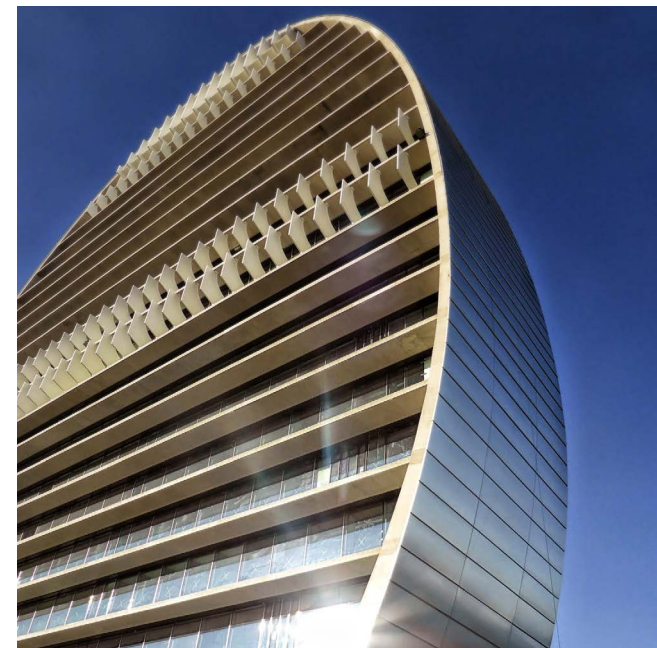
**Architects:** Herzog & de Meuron, Basel

**Structural Engineering:** Ortiz Leon Arquitectos, Madrid

“La Vela” (“the sail”) is the name of the iconic seat of the new headquarters of the Spanish Bank BBVA. Although the overall shape of the 93 m high building is that of an ellipse, the actual design involves a total of 36 different curvatures. The semi-reflective 2B surface is smooth enough to ensure good self-cleaning properties. In the hot climate of central Spain, it reflects infrared radiation away from the building and reduces the energy consumed for cooling. It helped the building to be granted LEED Gold certification. At the same time, the finish keeps light pollution to acceptable levels and prevents glare which is important in view of the nearby motorway.



Photos courtesy of BBVA



### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Brake pressing
<b>Grade and finish:</b>	304L, 2B (bright)
<b>Material thickness:</b>	Honeycomb sandwich panel with 0.8 mm stainless steel outer layer
<b>Date of completion:</b>	2014
<b>Manufacturing company:</b>	Permasteelisa España, Madrid
<b>Material supplier:</b>	Acerinox



## 5 Broadgate, London, UK

### Architects: make Architects, London

For the new UBS Headquarters in London, make Architects started from the visual concept of a giant motor block. This idea is implemented by covering the building with glass and Linen-patterned stainless steel sheets. The individual sheets are up to 6 m long. Stainless steel is the dominant facade material. While the proportion of the glass is relatively small, the large stainless steel surfaces reflect heat away from the building and reduce greenhouse effects typical of glazed structures. This design reduces the need for cooling and contributes to the energy-efficiency of the building.



Photos courtesy of make Architects



### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Brake pressing
<b>Grade and finish:</b>	1.4404 (316L), 2M (Linen)
<b>Material thickness:</b>	1.5 mm
<b>Weight:</b>	c. 500 t
<b>Date of completion:</b>	2015 (expected)
<b>Manufacturing company:</b>	Seele, Gersthofen, Germany
<b>Material supplier:</b>	Otokumpu

## International Gem Tower, New York City, USA

### Architects: Skidmore, Owings & Merrill (SOM), New York

Located in the Diamond District of New York City, 55 West 46<sup>th</sup> Street is specifically created for the gem and jewellery trade. The 34-story tower is wrapped in a three-dimensional, folded glass facade. The geometry of the stainless steel facade elements is reminiscent of the facets of a diamond. The interplay of light and glass creates dynamic, ever-changing reflections. In fabrication and installation, great care was taken to ensure flatness of the highly reflective sheet metal. The facade contractor developed a design which included vertical stiffeners to ensure perfectly even surfaces.



Photos courtesy of SOM



### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Brake forming
<b>Grade and finish:</b>	316 Mechanically polished (Starlight 7J® finish)
<b>Total weight of the stainless steel used in the project:</b>	132 tons
<b>Date of completion:</b>	2013
<b>Manufacturing company:</b>	Permasteelisa North America, Windsor, Connecticut
<b>Material supplier:</b>	Tsukiboshi Art Ltd., Tsugiya Amagasaki, Hyogo (Japan) and Contrarian Metal Resources, Allison Park, Pennsylvania (USA)

## Steel Company Headquarters, China

### Architects: Pelli Clarke Pelli Architects (PCPA), New Haven, Connecticut

The Shanghai headquarters of Baosteel (left) include three buildings with a total facade surface of 48,000 m<sup>2</sup>. Avoiding “light pollution” was among the priorities of the architects, who chose a pattern-rolled stainless steel surface. Mock-ups showed the consistency of their surface effects under various viewing angles and on rounded surfaces. For the company’s Southern headquarters in Guangzhou (centre and right), an identical facade material was specified for the 140 meter-high office building.

#### Details

<b>Environment:</b>	Coastal and industrial
<b>Grade and finish:</b>	316L, 2M (Linen)
<b>Weight:</b>	800 tonnes (Guangzhou and Shanghai combined)
<b>Date of completion:</b>	2015
<b>Material supplier:</b>	Outokumpu and Shanghai Krupp Stainless



Images courtesy of Outokumpu

## Rail Underpass, Sartrouville, France

**Architects:** EXIT Paysagistes, Bordeaux (France)  
**Structural Engineering:** OGI, Montreuil (France),  
**Light design:** Agence ON, Paris

For the refurbishment of a railway underpass in Sartrouville near the French capital, the architects decided to use stainless steel. Blue floor lights are reflected by the embossed cladding and provide basic illumination day and night. The pattern was inspired by the Milky Way and consists of nearly 400 panels with 100 different, individually embossed patterns. The supporting structure is composed of rectangular hollow sections mechanically fastened to omega sections. It is equally made from stainless steel to withstand the combined corrosive influence of humidity and exhaust gases.



Photo by Jean-Marc Charles

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Embossing
<b>Grade and finish:</b>	304L, 2B
<b>Material thickness:</b>	1.5 mm
<b>Weight:</b>	c. 85 t (panels)
<b>Date of completion:</b>	2011
<b>Manufacturing company:</b>	Sotralinox, Bréviandes (France)
<b>Material supplier:</b>	Tolartois, Béthune (France)

## Central Station, Rotterdam, The Netherlands

**Architects:** Benthem Crouwel Architects, Amsterdam, MVSA Meyer & Van Schooten Architects, Amsterdam together with West 8, Rotterdam (Team CS)

Rotterdam is the biggest sea port of Europe and number three world-wide. High-speed rail traffic and growing passenger numbers required an extension and full renewal of the station. The building envelope should be iconic on the one hand and reliably withstand the corrosive conditions of a coastal and urban environment on the other. Totalling 30,000 m<sup>3</sup>, both the horizontal and the vertical parts of the roof structure were clad with stainless steel. Seam-welded austenitic stainless steel is the only metallic solution for roofs which have flat or only mildly inclined roof surfaces. The seams ensure long-term water tightness, even in permanently submerged zones.

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Continuous seam welding
<b>Grade and finish:</b>	316L, 2B
<b>Material thickness:</b>	0.5 mm
<b>Total weight of the stainless steel:</b>	appr. 130 t
<b>Date of completion:</b>	2014
<b>Manufacturing company:</b>	Ridder Skins for Buildings BV, Zwaag, The Netherlands
<b>Material supplier:</b>	Aperam



Photos by Jannes Linders (left and central), Ben Bomhals (right)

## Bascule Pedestrian Bridge, Lyon, France

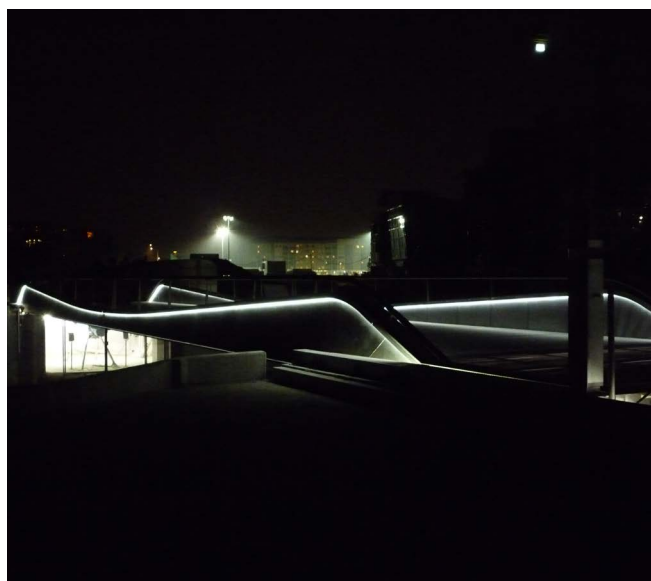
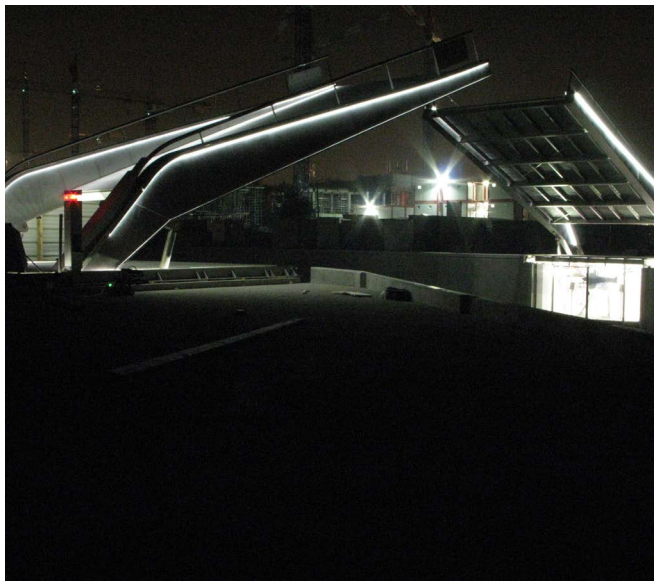
**Architects:** Patricia Colinet, PCCP, Paris

**Structural Engineering:** Groupe Alto, Gentilly (France)

At the confluence of the rivers Rhône and Saône in Lyon, a new quarter has grown around a new iconic museum. As part of the upgraded environment, a pedestrian bridge leads over a former dock which is now devoted to leisure activities. The structure was designed as a bascule bridge to allow also larger ships to enter the dock. The architects suggested a filigree shape, which should be outlined during the night by LED lighting. The aesthetic ambitions made weight saving essential and led to the selection of duplex stainless steel. Its high mechanical strength made it possible to reduce wall thickness by about 30% compared with carbon steel. The material ensures a long and virtually maintenance free service life. Making applied corrosion protection redundant, duplex stainless steel also contributes to the high sustainability profile of the bridge.

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Welding
<b>Grade and finish:</b>	2205 / EN 1.4462 (Uranus 45)
<b>Material thickness:</b>	2 - 30 mm
<b>Weight:</b>	28 t
<b>Date of completion:</b>	2009
<b>Manufacturing company:</b>	Viry, Remiremont (France)
<b>Material supplier:</b>	Industeel



Photos by Marc Malinowsky

## Allianz Parque, Palmeiras Stadium, São Paulo, Brazil

### Architects: Edo Rocha, São Paulo

The Allianz Park Palmeiras is a multi-functional arena that specifically serves the needs of a well-known São Paulo soccer team. Stainless steel tube and strip are combined into a proprietary facade system called "Stripweave". It provides an optimal balance between transparency and reflectivity for the hot and sunny climate of the region. As a material, higher alloyed ferritic grade 444 was identified as the best choice for the project. As an iron, chromium, molybdenum alloy, it is particularly price stable. The added molybdenum provides the necessary corrosion resistance for an urban environment.



Photos courtesy of Aperam South America



### Details

<b>Environment:</b>	Urban outdoor
<b>Fabrication process:</b>	Perforation
<b>Grade and finish:</b>	444, 2B
<b>Total weight of the stainless steel used in the project:</b>	210 tons
<b>Date of completion:</b>	2014
<b>Manufacturing companies:</b>	WTorre (contractor), Permetal (perforated sheet) and Hunter Douglas (facade)
<b>Material supplier:</b>	Aperam South America

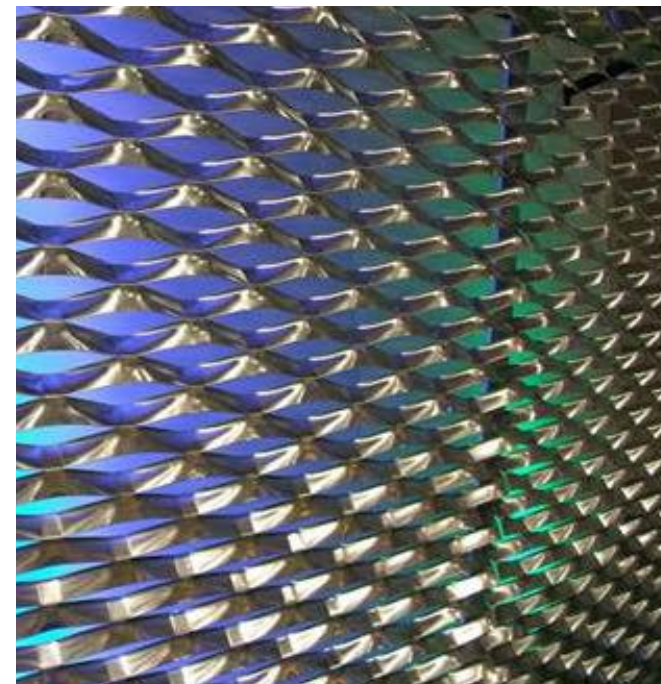
## Governador Plácido Castelo Stadium - Castelão Arena, Fortaleza, Ceará, Brazil

### Architects: Vigliecca & Associados, São Paulo (refurbishment)

The stadium in Fortaleza city in the North East of the country, called Castelão, hosted six World Cup matches. Designed for 64,000 persons and initially opened in 1973, it recently went through two years of refurbishments. The façade was entirely rebuilt using stainless steel stretch metal. The principle: by slitting sheet metal and expanding it, the material naturally shapes into a structurally optimal geometry. The stretching process is carefully controlled to produce the desired ratio of open and closed surfaces. Although the original 2B surface used is quite bright, the reflection of the stretch metal is diffuse. It reflects heat away from the building without causing glare. The molybdenum-bearing ferritic grade 444 was found to be technically and economically an optimal solution for the environment. In addition to the external frame, stainless steel was used on railings, handrails at VIP areas, lavatories and locks of the stadium.



Photos courtesy of Aperam South America



### Details

<b>Environment:</b>	Urban outdoor
<b>Fabrication process:</b>	Stretch forming
<b>Grade and finish:</b>	444, 2B
<b>Total weight of the stainless steel used in the project:</b>	80 tons
<b>Date of completion:</b>	2012
<b>Manufacturing company:</b>	Martifer, Fortaleza, and Permetal, Ribeirânia, Ribeirão Preto
<b>Material supplier:</b>	Aperam South America



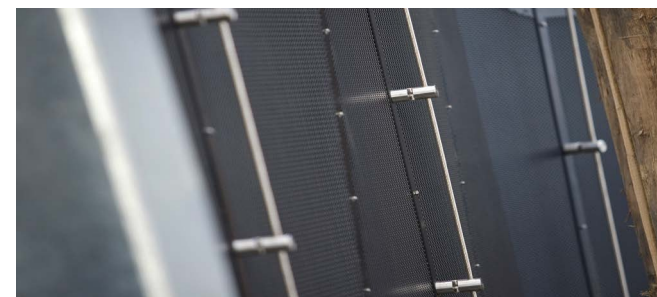
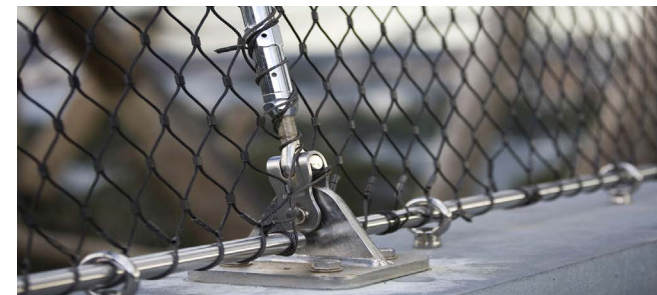
## Chimpanzee Sanctuary, Taronga Zoo, Sydney, Australia

### Architects: Jackson Teece Architects, Sydney

A stainless steel wire mesh system was used to refurbish a chimpanzee habitat, which should create a stimulating environment for the animals and allow visitors to watch them. The technical requirements had to take into account the remarkable strength of the animals and the corrosive coastal climate. The design involves 770 m<sup>2</sup> of blackened stainless steel wire mesh and 140 m<sup>2</sup> of non-climbable surfaces made from perforated stainless steel steel coated black. The fasteners are made from polished stainless steel and were specifically passivated prior to use.



Photos courtesy of ASSDA



### Details

<b>Environment:</b>	Coastal
<b>Grade and finish:</b>	304, painted black (wall cladding), 316, blackened (mesh enclosure), 316 (tubes and cables)
<b>Material thickness:</b>	Stainless steel cables: 8, 12 and 22 mm; tubes for enclosure: 3 mm
<b>Date of completion:</b>	2012
<b>Manufacturing company:</b>	Carl Stahl
<b>Material supplier:</b>	Ronstan Tensile Architecture and Locker Group

## Chapel of MIHO Art School, Kyoto, Japan

**Architects:** I. M. Pei and io Architects, New York

**Structural Engineering:** Leslie E. Robertson Associates, New York

The Chapel is the focal point of the MiHo Institute of Aesthetics, a boarding school for 240 students. The site is dedicated to the Shumei spiritual movement, for which the appreciation of art and the respect for nature are key elements. High architectural standards are part of the philosophy. The outer panels of the Chapel consist of trapezoidal stainless steel panels. Each of them is 18.5 m long and shaped into a unique computer-generated twisted geometry.



Photos courtesy of JSSA



### Details

<b>Environment:</b>	Rural
<b>Fabrication process:</b>	Laser cutting
<b>Grade and finish:</b>	SUS 304, bead blasted
<b>Material thickness:</b>	5 mm
<b>Weight:</b>	100 tons
<b>Date of completion:</b>	2012
<b>Manufacturing company:</b>	Kikukawa Kogyo Co., Ltd
<b>Material supplier:</b>	Nippon Steel and Sumikin Stainless Steel Corp.

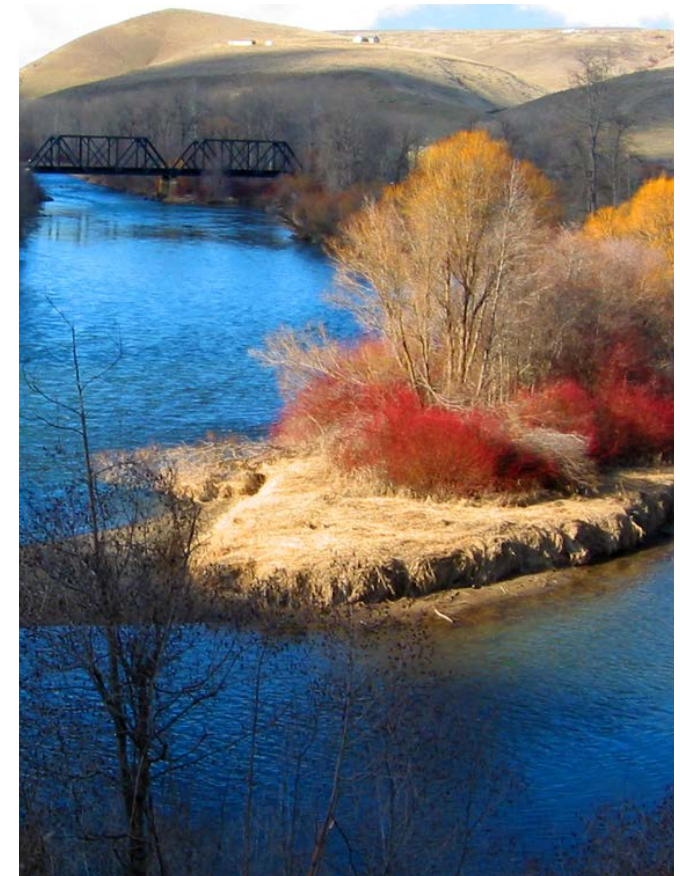
## Eisenhower High School, Yakima, Washington, USA

### Architects: KDF Architecture, Yakima, Washington

In their choice of materials and colours, the architects were inspired by the surrounding orchard landscape. The reflections of Yakima River, to which the town owes its name, were reproduced by electrochemically coloured stainless steel. Skilfully controlled variation in process times enabled the supplier to match the desired range of depth. As the cladding consists of stainless steel shingles, these were combined into a random pattern that contrasts with the warm colours of the brick used on the other walls of the building.



Photos courtesy of KDF



### Details

Environment:	Rural
Date of completion:	2009
Manufacturing company and material supplier:	Millenium Tiles

## Shopping Center, Doncaster, Victoria, Australia

Architects: Westfield Design and Construction, Sydney



Photo courtesy of ASSDA

In late 2008 the shopping centre completed a major refurbishment doubling the complex's size. Central to the new look and feel is the building's ultra contemporary and striking clad facade that features coloured (red) stainless steels whose hues change with the time of the day. The perceived colour results from light interference within the passive layer which is artificially thickened by an electrochemical process. The passive layer is in itself fully colourless and does not involve any dyes. For this reason it is insensitive to ultraviolet radiation and will not fade over time, which is an asset in the sunny climate of Australia. The substrate material had a rolled-on "Perla" finish, which serves three purposes. It reduces unwanted reflections, enhances optical flatness and increases the mechanical strength of the sheet through work-hardening, which made it possible to reduce the wall thickness from 1.5 to 1.2 mm.

### Details

<b>Environment:</b>	Urban
<b>Grade and finish:</b>	304, pattern-rolled and electrochemically coloured
<b>Material thickness:</b>	1.2 mm
<b>Total weight of the stainless steel used in the project:</b>	appr. 60 t
<b>Date of completion:</b>	2008
<b>Manufacturing company:</b>	Barde-Steeldeck Industries
<b>Material supplier:</b>	Steel Color Australia

## Burberry, Chicago, Illinois, USA

### Architects: Solomon Cordwell Buenz and associates, Chicago, Illinois

The flagship store for the Burberry Company in Chicago had to be eye-catching. In designing the facade, the architects were inspired by the idea of a package which is wrapped in glossy black paper and silver ribbons. Stainless steel was selected because the specific colouring processes for this material maintain the original metallic surface effect of the substrate. The stainless steel sheet was v-cut and formed into precisely outlined facade elements.



Photo by Robert Chase Heishman

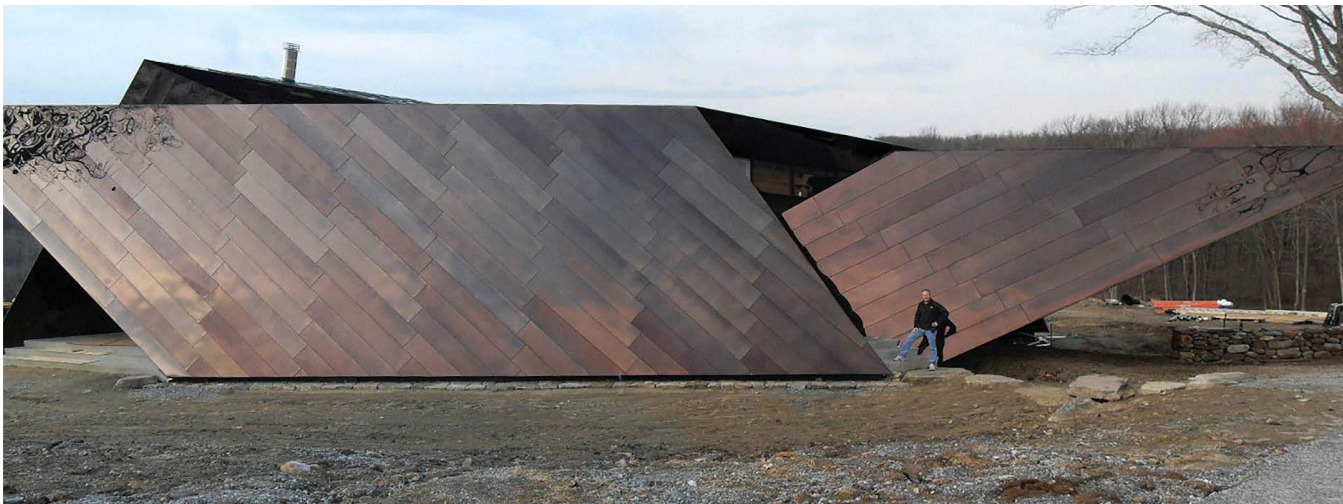
### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	V-cut edges to achieve tight and precise bends
<b>Grade and finish:</b>	304, Black Mirror PVD Coated
<b>Material thickness:</b>	1 mm
<b>Date of completion:</b>	2012
<b>Manufacturing company and material supplier:</b>	A. Zahner Company, Kansas City, Missouri

## Private Residence, Connecticut, USA

### Architects: Daniel Libeskind, New York

The cladding in bronze interference stainless steel makes the building envelope of this home as spectacular as its geometry. The material was chosen for the tight bends and hard edges that achieve a remarkable, almost crystalline appearance. Stainless was chosen for its durability and ease of maintenance. The mirror reflection which is unaffected by the electrochemical colouring process, coupled with the dark interference colour, produces a surreal image of the surroundings.



Photos courtesy of A. Zahner Company

### Details

<b>Environment:</b>	Rural
<b>Fabrication process:</b>	Brake forming and shearing
<b>Grade and finish:</b>	304 Dark Bronze stainless steel using the interference coloring technique
<b>Material thickness:</b>	0.8 mm
<b>Total weight of the stainless steel used in the project:</b>	7 tons
<b>Date of completion:</b>	2010
<b>Manufacturing company:</b>	A. Zahner Company, Kansas City, Missouri
<b>Material supplier:</b>	Rimex, Enfield, UK

## Regional Parliament of the French-Speaking Community in Brussels, Belgium

**Architects:** SKOPE, Brussels

**Structural Engineering:** Ariade, Brussels (nodes)

The Parliament of the French-speaking community in Brussels was erected in the historic city centre of the Belgian capital Brussels. The architects created a facade, which was modern, on the one hand, and blended well with the UNESCO world heritage-listed environment, on the other. Additionally, the structure is a model of energy-saving design close to passive house standards. The solution is a ventilated double facade, made up of hexagonal elements of varying dimensions. They were welded from type 304 (EN 1.4301) stainless steel rectangular hollow sections of 120 x 40 x 4 mm and painted black.



Photo by George de Kinder

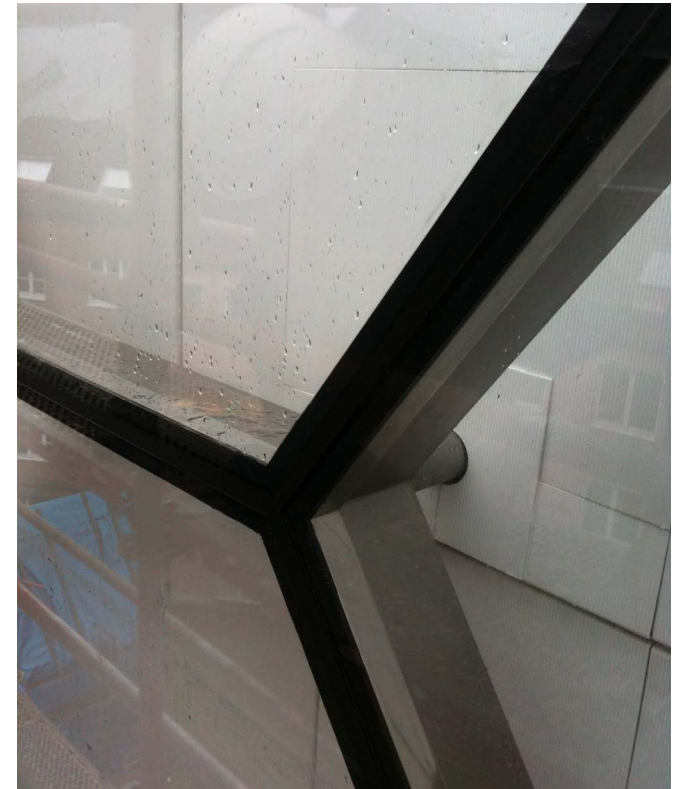


Photo courtesy of SKOPE

### Details

<b>Environment:</b>	Urban
<b>Fabrication process:</b>	Welding
<b>Grade and finish:</b>	304, painted
<b>Material thickness:</b>	4 mm
<b>Date of completion:</b>	2013
<b>Manufacturing company:</b>	Groven+, Puurs (Belgium)

## Gin Distillery, Basingstroke, UK

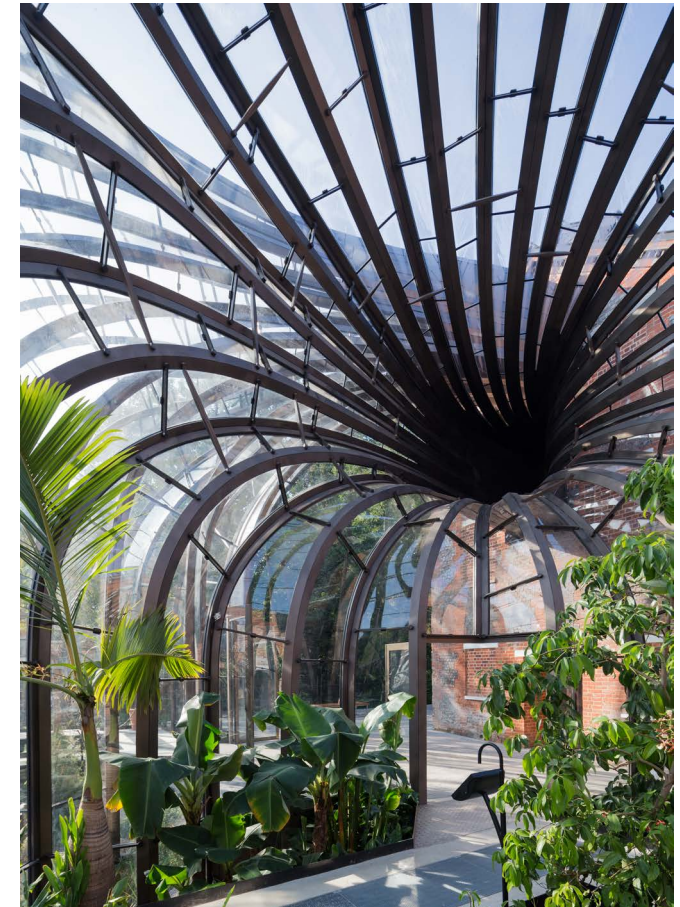
**Architects:** Thomas Heatherwick, London

**Structural Engineering:** ARUP (glass house), London

On the site of a historic corn mill, the Bombay Sapphire gin distillery unites the company headquarters and production facilities. The focal point of the redevelopment is two botanical glasshouses, one tropical and the other Mediterranean. Heated with the waste thermal energy from the distillation process, they house and cultivate ten important plant species used in the gin-making process. The precision-engineered structures are constructed from 893 individually crafted pieces involving more than a kilometre of bronze-coloured stainless steel framing.



Photos by Iwan Baan



### Details

Environment:	Rural
Grade and finish:	Bronze-coloured
Date of completion:	2014



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## About ISSF

The International Stainless Steel Forum (ISSF) is a non-profit research and development organisation which was founded in 1996 and which serves as the focal point for the international stainless steel industry.

### Who are the members?

ISSF has two categories of membership: company members and affiliated members. Company members are producers of stainless steel (integrated mills and rerollers). Affiliated members are national or regional stainless steel industry associations. ISSF now has 65 members in 25 countries. Collectively they produce 80% of all stainless steel.

### Vision

Stainless steel provides sustainable solutions for everyday life.

### More information

For more information about ISSF, please consult our website [worldstainless.org](http://worldstainless.org).

For more information about stainless steel and sustainability, please consult the [sustainablestainless.org](http://sustainablestainless.org) website.

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