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Trends in Building: The Future of Smart Façades is Written in Copper

Is the dynamic façade set to become the great architectural trend of the end of this decade? If so, copper has a prominent role to play in the revolution. Durable, malleable and scalable, it is a material of choice for architects who innovate in designing functional cladding. The judges of the European Copper in Architecture Awards 2017 can testify to this fundamental tendency: four of the eight Shortlisted buildings have dynamic façades. These no longer simply act as envelopes. In the form of copper sails or strips, they are able to better manage light and heat, and improve the energy performance of buildings. In the form of a raw surface that evolves over time, the façade gives life to a building and becomes the key to its environmental integration.

From Norway to Italy, via Switzerland and France, there follows a tour of Europe’s intelligent architecture, illustrated by their dynamic copper façades.



Perforated and articulated copper alloy façade. Trollbeads Headquarters. Copenhagen, Denmark. Photo by Jens Markus Lindhe.	Continuous curvilinear copper façades. Maersk Building. Copenhagen, Denmark. Photo by Adam Mørk.	Perforated and patinated copper. Communal Stage. Trondheim, Norway. Photo by Mathias Herzog.	Perforated natural copper. Conservatoire Debussy. Paris, France. Photo by Sergio Grazia.
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Copper’s contribution to the dynamic façade revolution

Responding to changes in urban life—both organisational, technological and societal—architects and town planners must innovate. Dynamic copper façades enable modern buildings to interact with their environment, and can limit the use of artificial lighting and heating, regulate aeration, light or transparency, and create unprecedented visual effects.

Copper and its alloys allow great architectural creativity, and are the go-to materials for functional façades thanks to their malleability and ease of installation. Copper sheets are lightweight, easy to work and assemble, aesthetically pleasing and extremely durable. Copper cladding offers a long service life without maintenance. A wide range of finishes are available: smooth and glossy, perforated, embossed, pure or alloyed, raw or pre-patinated. This last option makes it possible to exploit the wide range of colours offered by copper’s natural oxidation process right from its installation.

Five functional and dynamic copper façades

Hydropolis in Wroclaw: façades of copper and water



Hydropolis Park, Wrocław, Pologne.
© Michal Lagoda

In the Polish city of Wrocław, ART FM transformed a remarkable 19th century reservoir into a theme park dedicated to water: Hydropolis. This makeover is characterised by a new copper façade and an innovative sculpture called a 'water printer'. The copper emphasises the beauty of the historic building with its visual appeal and aesthetics, while giving the extension a very contemporary look.

Copper is used for the roof and façade of the new annex, as well as for sliding perforated panels. It will oxidise naturally, and its colour will be similar to that of brick masonry. The 'water printer' sculpture consists of twelve fountains concealed behind the copper façade.

Sun and moisture penetrate the irregular openings of the perforated copper panels, creating a unique play of light and reflection, intensifying the perception of space in the hall. This park is one of the Shortlisted projects of the 18th edition of the European Copper in Architecture Awards, whose results will be announced in late 2017.



Communal Stage in Trondheim: copper and lights!

This curious copper drum floating above Trondheim's city square in Norway is worth a visit thanks to the different perforated and patinated copper finishes, and the colour of the awning, which changes over the course of the day. The green patina can be seen during daytime, the colours change in the evening thanks to the light coming from the inner circle, reflected by the copper screen. Thus, this copper drum fits perfectly into its environment: discrete by day, with a natural appearance, and lighting up at night thanks to an energy-saving system.



© Mathias Herzog

The cylinder consists of three layers: a reflective inner surface, a natural copper interlayer, and a hand-patinated green copper exterior. The two copper layers are perforated to allow sunlight in during the day, and LED lighting out at night. This structure is also Shortlisted for the 18th European Copper in Architecture Awards.

Maison Dumont in Geneva: copper cladding to avoid the 'vis-à-vis'

In the heart of Geneva's old town, Maison Dumont is a very contemporary building created by Meyer Architecte, whose copper façades are modulated according to the light. The roof, also made of copper, runs the length of the building and the building allows light into the backyards of two historic buildings that formerly lacked it.



© Joël Tettamanti

On the penthouse level, a facade made of copper strips makes it possible to avoid the 'vis-à-vis'. Thanks to copper's malleability, the blades have been folded diagonally, and can be modulated like a blind. They veil the façade along its entire length, creating a play of light and transparency. The occupants of the apartment thus gain privacy without losing brightness.

Barn Renovation in Sesto san Giovanni: copper shutters against the sun and rain



© Simone Bossi

A large, ruined barn in Sesto San Giovanni, near Milan, has been renovated by Studio Roberto Mascazzini Architetto to accommodate six individual dwellings.

The bricks and porphyry that made up the roof and floor of the old barn were reused for the new building in order to preserve the historical materials.

To add a touch of modernity, the architects covered each of the six houses with dynamic copper façades, with shutters that can be adjusted to protect the occupants from the sun and rain. This minimalist architectural design makes gutters and window sills unnecessary. This renovation is a Shortlisted project for the European Copper in Architecture Awards.



© Simone Bossi

[Debussy Conservatory in Paris](#): a perforated copper façade to illuminate artists

Designed by Basalt Architecture, the Conservatoire Claude Debussy is located in the heart of the 17th arrondissement of Paris.

Its perforated copper façade animates the building day and night in a ballet of light and shadows. The perforations on each copper flap act as a solar filter, necessary for the comfort of the artists and their public. From the patio to the lower levels, light penetrates the heart of the building thanks to this system of copper shutters.



© Sergio Grazzia



© Sergio Grazzia



With this original architectural choice, the National Conservatory of Music, Dance and Dramatic Art holds a dialogue with the city, its copper skin making the building a landmark in the heart of the most traditional Haussmann buildings. Its copper façade will long protect this place of artistic creations, weatherproof and maintenance-free, destined to gradually patinate. A view of the surface evolution is available to view on copperconcept.org.

About CDA

Copper Development Association is a non-profit organisation that promotes and supports the use of copper based on its superior technical performance and its contribution to a higher quality of life. Its services, which include the provision of technical advice and information, are available to those interested in the utilisation of copper and copper alloys in all their aspects. The Association also provides a link between research and the user industries, and is part of an international network of trade associations: Copper Alliance.

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