

# COLOUR-EFFECT-SPECTRUM

Prinz Optics · VarioTrans®-Infoletter 1 · 2015

## VarioTrans®-Glass in the „One World Trade Center“: A reception of joyful colour

The new and undoubtedly breath-taking “One World Trade Center” has been open since 4 November 2014. The first tenants were able to take possession on that day. With 104 floors and a height of 541 metres (equivalent to 1776 feet, thus symbolising the year of the Declarati-



on of Independence of the United States of America), it is the tallest building in the western hemisphere and the fourth highest in the world.

It was originally the design of the American star architect Daniel Libeskind who won the architectural competition to design the new World Trade Center, the “Freedom Tower”, in 2003. The name has since been changed to the “One World Trade Center”. And it was finally built by David Childs from the New York architectural practice Skidmore, Owings and Merrill (SOM). This favourite architect of the property developer responsible, Larry Silverstein, tailored the Libeskind design to meet the interests of the occupants.

Since spring 2015, after eight years of construction, the building is also open to visitors at the three viewing platforms on the floors 100 to 102 and the restaurant above these, which is open to the public too. All visitors enter the skyscraper through the entrance areas on the north and south sides. Here, too, the dimensions are breath-taking – the two public lobbies are 20 m high and generously glazed to the outside.

No less impressive than this spatial experience is the radiance that can be perceived even from outside the glass installations in front of the so-called baffle walls of the lobbies. “VarioTrans®” colour-effect glass produced

### Editorial

Our dichroic glass (from the Greek “dichroos” = two-toned) has now been providing architecture and fine art with “enchanted” colour-and-light effects

for more than a decade. Significant buildings, such as the “Harpa” conference centre and concert hall in Reykjavik, and the recently opened terminal at Mumbai airport, have surprised observers and visitors with fascinating colour made from pure light.

For a few weeks now, the One World Trade Center has also been included in their number.

Peter Röhlen  
CEO



by PRINZ OPTICS is integrated in this installation. This mineral-coated yet transparent glass generates colour from light. Applied extremely thinly in the nanometre range, the coating provides interference effects, which – dependent on the angle of incidence of the light and on the angle of view of the observer – reflect determinable spectral colours and/or transmit their complementary colours.

The two baffle walls are respectively clad with 90 laminated safety glass panes in a 4.0 x 1.4 m format. Our

comb form into the facade he designed for the “Harpa” conference centre and concert hall in Reykjavik in 2011; one year later this was followed by the new terminal at Mumbai airport designed by SOM. Here there are 6,500 round VarioTrans panes inserted into the hall ceiling and column capitals, which project a play of colour and light onto the floor. The reason that we were able to realise this impressive installation arose from a contact made back in 2006 in the early phase of the Tower One project with the Mumbai planning team of the New York architectural practice SOM.



dichroic filters are let into the long sides of the panes as a 20 cm wide strip, which allows intense green light into the building and reflects violet light.

After passing the baffle wall, the visitor steps into the actual lobby and is also welcomed here by our “play of light”. On the wall behind the reception desk – also conjuring up green and violet light effects – are an impressive 90 narrow glass strips, 20 cm wide, containing our dichroic glass, and protruding vertically from the wall.

Within just three years, it is the third spectacular architectural project in which colour-effect glass from Stromberg is effectively shown to advantage. The Icelandic artist Olafur Eliasson, who lives in Berlin, integrated it in honey-

Whilst the realisation of the Mumbai project progressed briskly, it took five years before the order for the VarioTrans installation was issued. Finally, between spring 2013 and April 2014, the special glass, commissioned by the facade construction company APG in New Jersey, was delivered by PRINZ OPTICS to European glass processors. In total, 770 m<sup>2</sup> of our intensive green transmitting colour-effect glass was laminated here to become wall cladding, before APG finally installed it in the reception areas. As a sight that stands above all others, the new One World Trade Center at Ground Zero provides a proud, joyful and – en passant – colourful reception for all its employees as well as visitors.



## Lots of (colour) play in the facade design

With VarioTrans®, the dichroic glass from PRINZ OPTICS, almost any colour of the spectrum can be generated from light: both additive (red, green, blue) and subtractive colours (yellow, magenta, cyan). The ability of this special glass to generate an intensive, variable colour from pure light, is based on the interference of light waves at the extremely thin, optically transparent coatings on the glass. Dependent on the respective angles of illumination and observation, it may appear simultaneously colourless or intensely coloured, transparent or reflective, and differently coloured by day and at night. Thanks to its changing colours and almost unlimited light transmission, VarioTrans® opens up a wide range of play for impressive architectural solutions.

The colour effect of the glass extends far into the room or – when lit from inside – to the outside. Different colour effects can be selected. They can be controlled by the type of minerals used for the coating. There are 30 standard colours and other special colours available. The widest range of colour combinations is possible. This also applies to gradients, which can be used to achieve particularly spectacular effects. The gradients can cover the entire spectrum of colour or be created in a targeted manner in just a small sub-section of the spectrum.

Types of glass with several optical interference layers generate different colour effects. The colour effect of these types of glass varies, dependent on the solar irradiance or location of a source of artificial light, and also depends

on the angle of view and the background. This produces a lively play of colour, the gradient of which can be determined by an appropriate combination of applied layers.

The aesthetic effect of the colour-effect filters is based on the simultaneous perception of reality and emotional feelings. What at one moment is transparent appears multi-coloured and reflective at the next, when viewed from another angle or with a change in the way the light falls. In this way, facade designs can be experienced equally from both inside and out. Even in interiors, this “wonder glass” opens up a wide range of creative possibilities. Optically weightless, attractive yet extremely stable, rooms can be divided and room-in-room solutions achieved.



In neither the design of the room nor the object does the surprising effect of dichroic glass depend on the greatest possible proportion of high-quality colour-effect glass across the entire area of glass. Even a minimal inclusion of VarioTrans® makes glass facades and glazed roofs additionally attractive and original.

Heat and solar radiation cannot affect the filter properties. Unlike coloured glass, they are not subject to any ageing process. The filters cannot fade.

To combine colour-effect glass with normal glass, the colour-effect glass is surrounded by a clear or opaque compound film and embedded in any size of laminated safety glass. In this way, the dichroic colourfulness can be

restricted to defined areas in a standard glass pane. The colour-effect glass, which can be designed in any shape or size – including lettering or mosaics – becomes an eye-catcher. The minimum thickness of this combination is 12 mm and is thus suitable, for example, for the design of colour-effect glass doors.

Large filter glass surfaces, which exceed the maximum dimensions of a single filter pane (approx. 6 x 3 m), can be designed by butt-joining several filter panes.

The safety of VarioTrans glazing is guaranteed when the coated glass is used as laminated safety glass, often in association with toughened safety glass. For “overhead”

use, we recommend using our dichroic glass as a laminate with heat-strengthened glass (VSG / TVG combination). Glass coated using the Sol-Gel procedure can be further processed using the usual glass-processing methods such as drilling, notching, breaking and grinding. Always ensure the highest levels of cleanliness during processing: avoid sanding dust and metal parts affecting the coated surfaces.

Further information:

[www.variotrans-glass.com/htdocs\\_en/information/applications.html](http://www.variotrans-glass.com/htdocs_en/information/applications.html)

## Be fascinated: Clear glass that shines in changing colours.

Request samples online

[http://variotrans-glas.de/htdocs\\_en/contact/index.php](http://variotrans-glas.de/htdocs_en/contact/index.php)

or via Fax +49 6724 / 601 93 11:



We send you our set of samples  
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The next issue of our Colour-Effect Spectrum will provide information about the use of colour-effect glass in the fine arts.

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