RAICO

# ETFE_THERM+ | FILM

The first serially producible ETFE façade modular system

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# ETFE_THERM+ PREFACE

Photos: RAICO

**Building shells constructed from ETFE film repeatedly reveal sophisticated architecture in an impressive way in the course of façade design.**

At the same time, the film has proven itself as a reliable and high-quality material in a multitude of projects worldwide.
With ETFE_THERM+, RAICO introduces the first prefabricated modular ETFE façade panel, which ensures full compatibility with RAICO's tried and tested THERM+ product range.
This means that no complex system change is required when combining with glass, sheet metal and other common types of coating.
The aluminium frame is optimised in terms of structural physics and design, forms a static and functional unit with RAICO's THERM+ system during assembly and achieved top marks in the renowned façade tests for quality assurance.
Carefully thought-out parametric planning routines, the highest degree of prefabrication and maximum modularity meet all the demands of the modern digital planning and construction process.
The data models, which are consistent and comprehensive, create a transparent basis from design to assembly for all parties involved in the planning process.
ETFE_THERM+ constitutes a milestone on the journey to meet the constantly growing demands for flexibility and functionality.

# ARCHITECTS' DARLING

Category: Best Product Innovation Technology

For many years, Heinze Architects' Darling®, the largest industry survey in Germany, has been synonymous with the acknowledgement of companies in the construction industry.

**At the end of 2018, ETFE_THERM+ won the Silver Award in the category "Best Product Innovation Technology".**

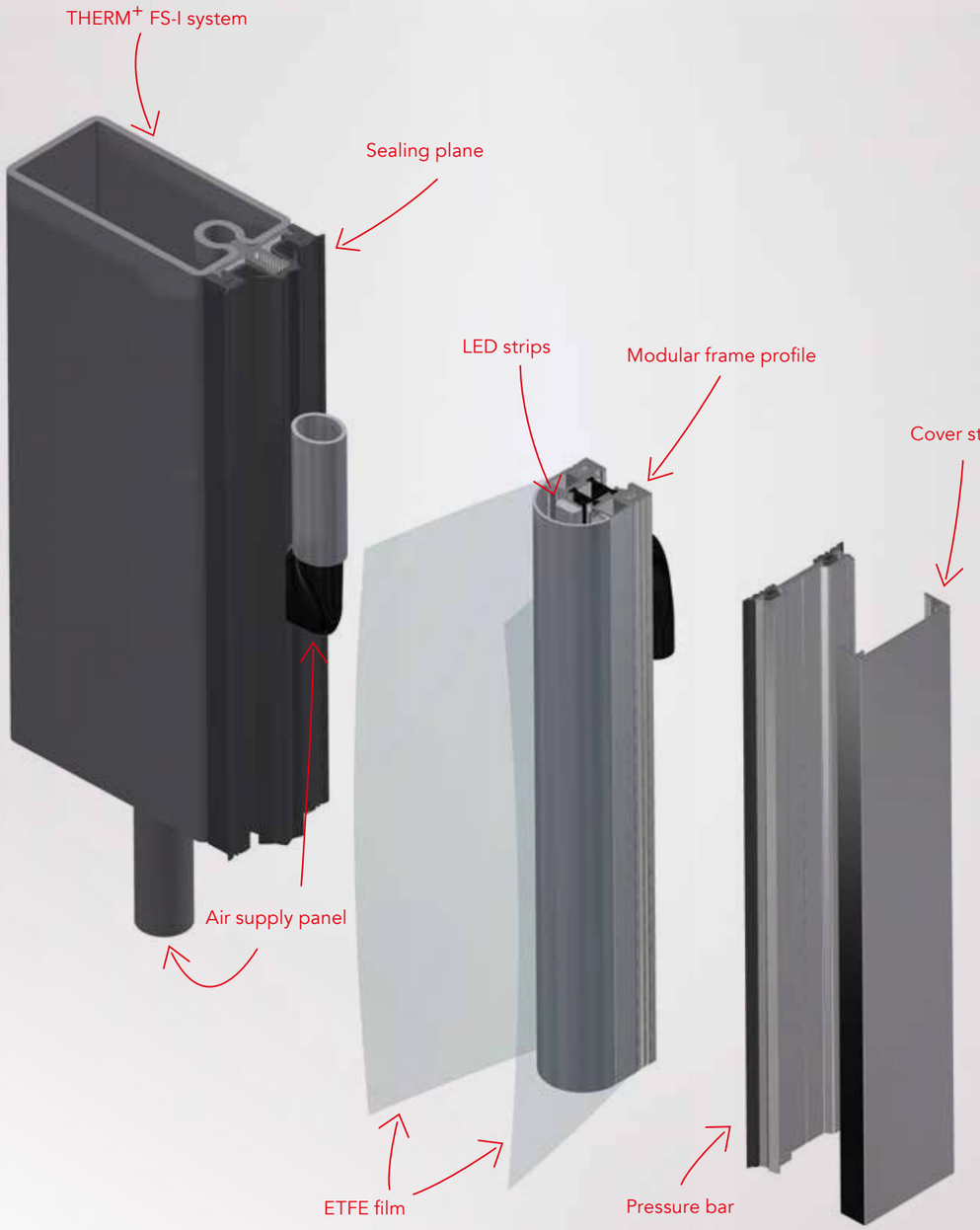
Quotes taken from the jury's evaluation:

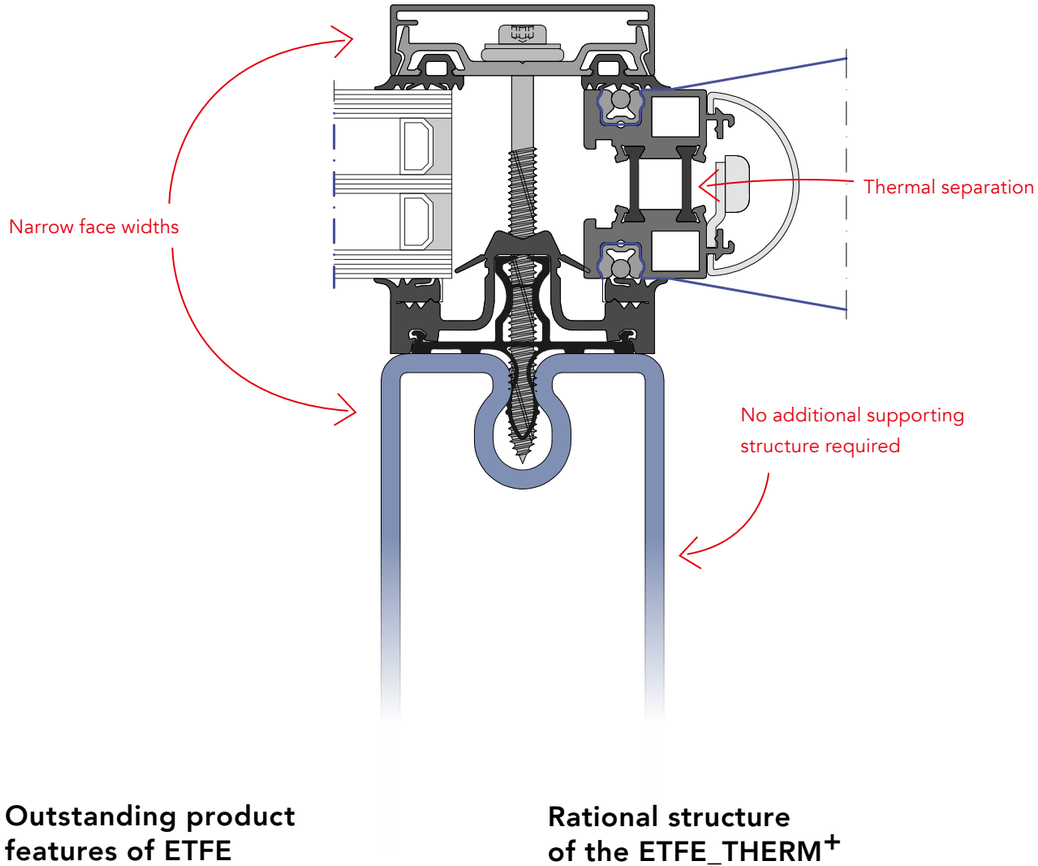
*"Now this is true innovation! We have been suggesting ETFE façades to builders on numerous occasions, but it always failed due to the fear of overly complicated building processes or special constructions."*

*"An exciting innovative idea that offers new design possibilities!"*

# MODULAR ETFE FAÇADE SYSTEM

*ETFE façades with a modular design*




## Outstanding product features of ETFE

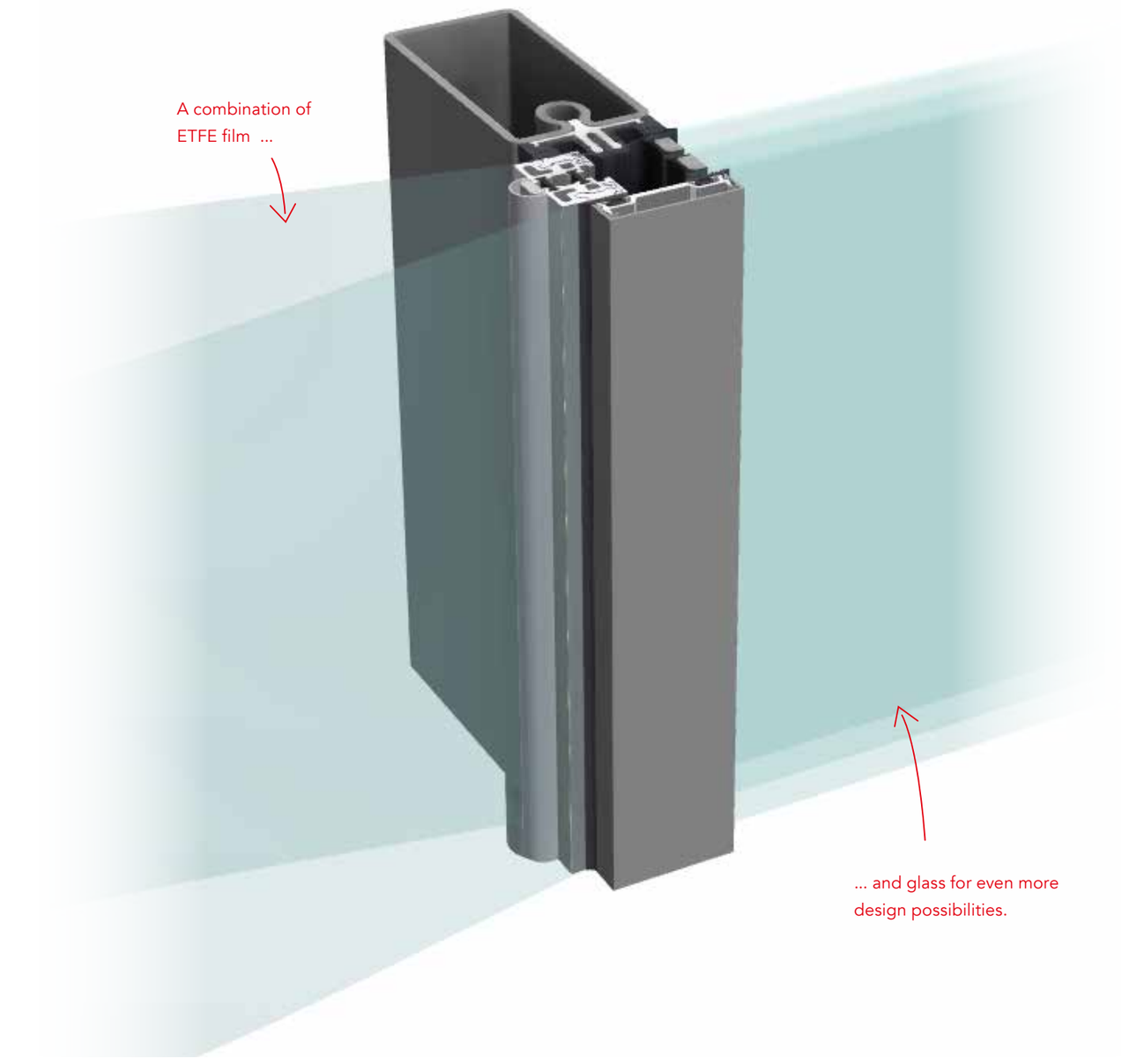
- Very good mechanical strength, especially tear strength and tear propagation resistance
- High weather resistance
- High light transmission in visible light and in the UV range
- Self-cleaning action thanks to the anti-adhesive surface
- Colouring in various RAL tones possible (Xenon test pursuant to DIN ISO 4892-2)
- Printing in a variety of designs
- Low flammability according to building material class DIN 4102 B1, classification according to DIN EN 13501-1: B-s1, d0, UL 94: V0
- Can be illuminated with LEDs
- Almost fully recyclable
- The use of organic photovoltaics is feasible

## Rational structure of the ETFE_THERM+

- ETFE_THERM+ is a prefabricated, modular ETFE façade panel.
- The frame mainly serves to border the element. In order to guarantee static functionality, the frame must form a unit with the RAICO mullion-transom system (e.g. connection to the existing screw channel).
- Requirements in terms of structural physics such as air and water tightness of the façade and condensate drainage (rebate drainage) are guaranteed thanks to the mullion-transom system.
- In order to ensure compatibility with other covering elements (glass, sheet metal, etc.), the cross-section of the frame is adapted to the mullion-transom system.
- Narrow face widths
- no additional supporting structure
- Air supply integrated into profile ▸ not noticeable
- Thermal separation by spacing of the films and plastic webs in the frame profile

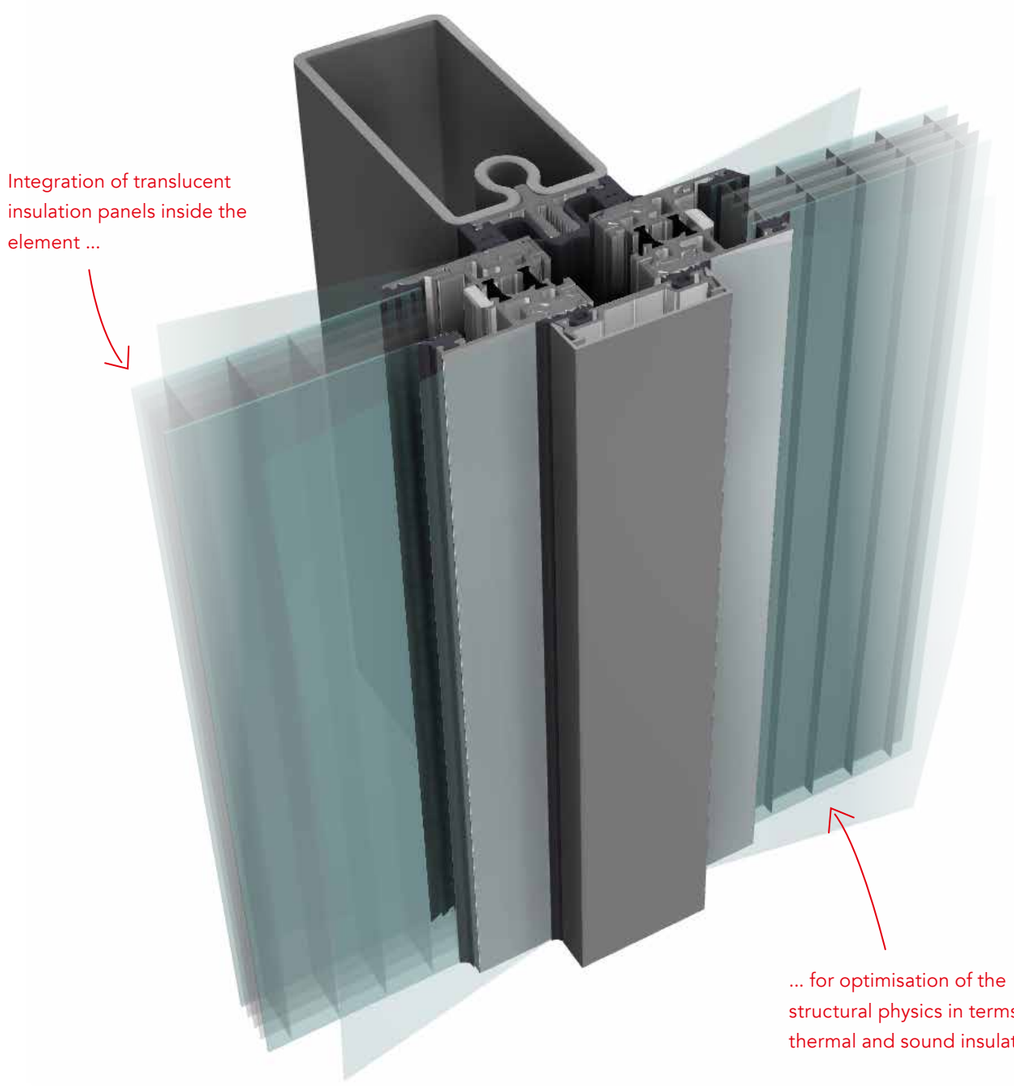
# ONE SYSTEM ...

Variant: ETFE_THERM+ combined with glass




# ... A MULTITUDE OF POSSIBILITIES

Variant: ETFE_THERM+ with a thermally optimised element

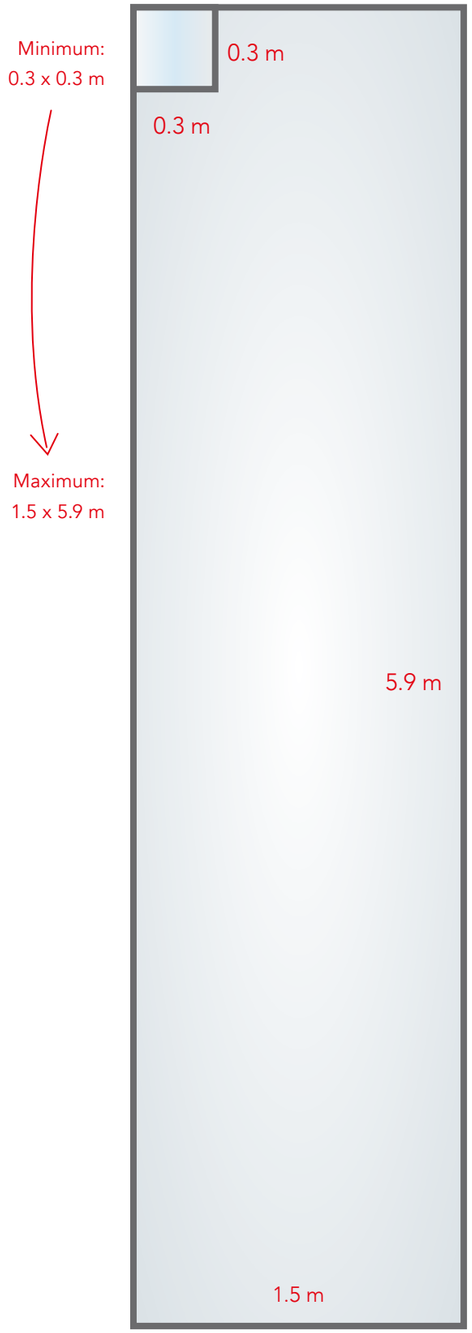


# DIMENSIONS

## ETFE_THERM+

The dimensions range from 0.3 m x 0.3 m to 1.5 m x 5.9 m. Other sizes and shapes (e.g. triangles) are of course also possible.

| Measurements | |
|---|---|
| **Minimum** | 0.3 x 0.3 m |
| **Maximum** | 1.5 x 5.9 m |




## ETFE_THERM+ in 3D

A fantastic 3D look of the façade is created by using pneumatic ETFE cushions. You can read more about why these air cushions are necessary in the “Air supply” section on page 13.

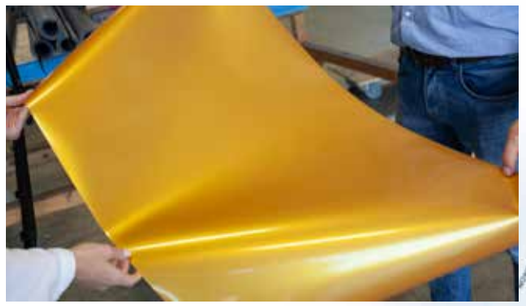
# FILMS

## ETFE_THERM+ | NOWOFLON®

Only certified, premium quality fluoropolymer films from NOWOFOL are used for the ETFE_THERM+ element.
A unique combination of technical and physical properties transforms this film into a high-performance material that has become indispensable in modern architecture.
Coloured ETFE films with unlimited design possibilities are available in a wide range of colours.

The exceptional technical and physical properties remain identical to those of the transparent film type. A transparent film that absorbs infrared is available as a special product. Infrared radiation that causes heat to accumulate up in buildings is absorbed, so that buildings heat up more slowly.

| Technical data for the transparent standard film | |
|---|---|
| **Roll width** | 1.55 m |
| **Grammage** | 350 g/m² for 200 µm film |
| **Colours** | Wide range of colours available |
| **Fire classification** | B1; B S1s d0; UL 94: V0 |
| **Max. operating temperature** | -200 – 150 °C |
| **Translucency** | 90 – 95 % |
| **Reflection** | < 10 % |
| **UV permeability** | ~ 70 – 80 % |
| **Colour rendering index** | 98.8 |
| **Solar factor** (can be modified through printing) | 0.925 |
| **Recycling** | 100 % |



# PRINTING

## Digital

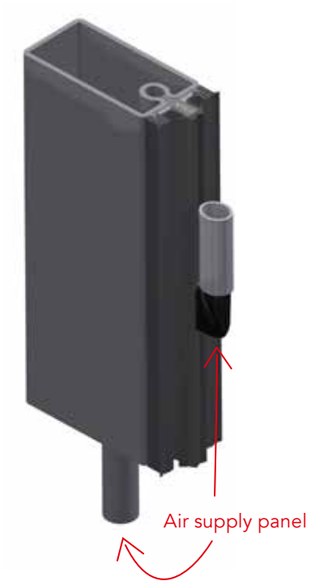
The possibility of full-surface digital printing of the film, together with the wide range of colours available, enables a unique combination for fulfilling the highest architectural demands. This means that nothing can stand in the way of implementing a corporate identity that extends all the way to the façade covering of a building.

## Web-fed printing

A vast selection of standardised patterns ensures that the structural physics requirements with regard to solar value and light transmission can be met with pinpoint accuracy. Highly reflective colours in silver tones are primarily used for this purpose.

# AIR SUPPLY PANEL

## Practically invisible




Similar to a closed cavity façade, the ETFE_THERM$^{+}$ façade element is supplied with a slight positive air pressure. Apart from preventing condensation from forming on the inside, the full static performance of the film, which is only approx. 0.2 mm thin, is therefore guaranteed. Upon request, the necessary blower units can be integrated into opaque façade areas (e.g. behind sheet metal panels). Needless to say, nothing stands in the way of placing them in supply rooms with other building services equipment. The air ducts are then directed to the façade via supply shafts. There they are connected to the integrated lines of the ETFE_THERM$^{+}$ façade system.

# SUSTAINABILITY

## A seamless process chain

Fluoropolymer films will retain their properties regardless of exposure to UV light or other common environmental influences. Since no additives such as flame retardants, plasticisers, etc. have been added, the film can be converted as is into reusable granulate without any complicated processes. The recycling process chain – cradle to cradle – is seamless and can be carried out without incurring losses.

**NOWOFLON ET film is certified according to:**

- BREEAM® – Building Research Establishment Environmental Assessment Method, NEW CONSTRUCTION 2014
- Sustainability information on DGNB building certification (German Sustainable Building Council)
- LEED v4® – Leadership in Energy and Environmental Design

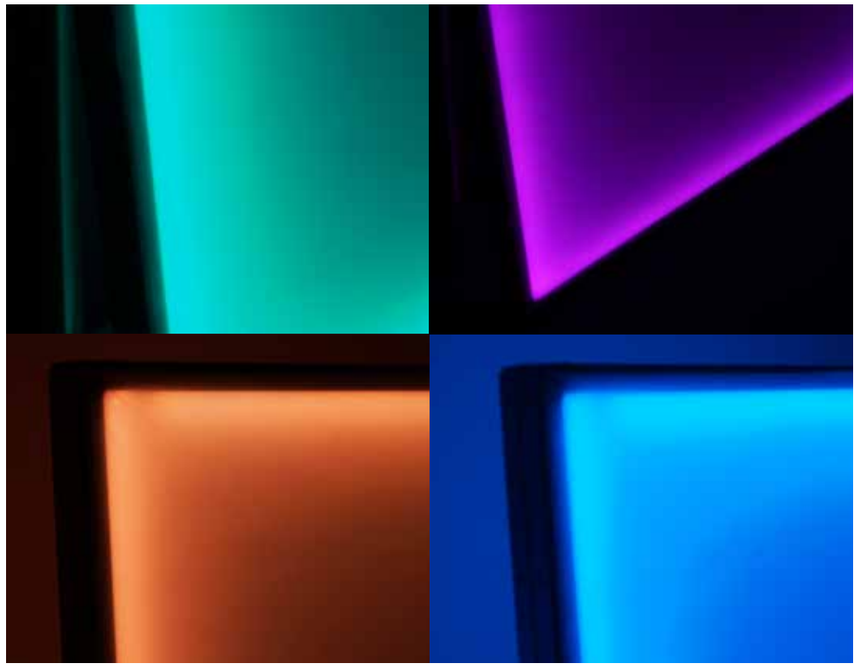
# LED

## A light show of colours

The ETFE_THERM$^{+}$ façade element can be equipped with LED light strips in the frame construction. Only certified products are used for this purpose.

This means that, depending on individual requirements, it is possible to integrate an incomparable light show into the façade using digital control systems.





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