

# Transparent Building Skins

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## ABSTRACT

Just a few materials exist, which allow a transparent building skin. Primarily we think of rigid panes of glass or plastic materials. However, also flexible membrane materials are available today to achieve transparent roofs, façades or complete building envelopes.

All of these materials have different properties, why the decision for one of them depends on the project specific demands. A good example, to show the available materials for double curved transparent building materials, is the project SWATCH OMEGA HEADQUATERS in Biel, Switzerland (Fig. 1).

The innovative building with its exciting skin, was designed by Shigeru Ban Architects, advised in technical questions related to the building envelope by the engineers from LEICHT. The building is currently under construction and should be completed in the next year. Its building envelope consists of single wooden frames as multifunctional modules, fixed on a wooden primary structure. Therefore, after the duration of use, single modules can be replaced or demounted and the used materials can be recycled separately. Most modules are filled with double curved transparent or translucent materials, as rigid glass panes, as ribbed double sheets of polycarbonate (PC) or as flexible air inflated ETFE-foil elements - some realized as conventional double-layer cushion and some as unconventional three-layer-system (ETFE + PC + ETFE).

Taiyo Europe was commissioned by the general contractor ROSCHMANN, to realize the ETFE-modules and the complete air supply system for ETFE- and glass modules. The glass modules are designed similar to closed cavity façades (CCF) with a small overpressure. These modules contain movable textiles, serving as retractable shading system, which is enclosed by the wooden frame and the double bended or planar single and double sheet glass panes.



Fig. 1: SWATCH OMEGA HEAD-  
QUATERS, Mockup in Biel  
Switzerland, Photo: K. Moritz, 2016

The question arises, whether membrane constructions, initially developed from sail making, with its beautiful anticlastic surfaces, as we know it, develop more and more into multifunctional modular constructions or not? This question will decide about growth or deterioration of specialized membrane fields. We are looking forward to some interesting examples, which could be an indicator for the direction the building with membranes develop in future.