



HORTEN KØBENHAVN DENMARK



FREE FORM FAÇADE

# 3F FREE FORM FAÇADES – A NEW ARCHITECTURAL CLADDING INNOVATION FROM SKANDINAVISKA GLASSYSTEM AND DIAB

THE 3F CONCEPT: PREMANUFACTURED, SELF SUPPORTING, COMPOSITE FAÇADE MODULES USED TO REALIZE MODERN, INNOVATIVE AND CRATIVE ARCHTECTURAL DESIGNS

## BACKGROUND

In the Spring of 2007 Skandinaviska Glassystem was asked to produce the façade for Horten building, a six storey office block in Copenhagen that would present two entirely different design aspects depending on the viewpoint. Viewed from the one side, the building would appear to have a façade that was basically a glass wall. Viewed from the opposite side, the façade would appear to be completely finished in marble. The same effect was required for all four sides of the building – a total area of 4,000 m<sup>2</sup> (43,000 ft<sup>2</sup>).

Achieving such an effect involves the use of a complex geometric arrangement. The traditional approach would have been to create a steel latticework on to which the travertine stone cladding and glazing units would be attached. However, in the case of this building this was simply not feasible in terms of building loads, cost and installation time. A solution was required that would be significantly lighter than the steel latticework, would allow rapid installation and would preserve the architect's original vision. In addition any solution would need to meet the prevailing fire regulations.

## TESTS

The 3F concept is sprung out of the co-operation between DIAB and SG during the Horten project, where SG developed an innovative, modular system that makes extensive use of sandwich composites to support both the glass and marble elements. DIAB was brought in as composite experts to define and meet the structural requirements of the application and was able to pass the fire testing. The fire tests was carried out at SP Fire Technology in accordance with appropriate Danish building regulations.

## 3F BENEFITS

Each module is approximately 4 x 4.5 meters. As the system is significantly lighter than the traditional approach - by a factor of around 4:1 - it is well within the permitted building loads. Further time and cost is saved as the modules can be installed directly to the steel reinforced, concrete floors of the building virtually as soon as the floors are complete and without the need for additional supporting steelwork.

Other benefits of taking the sandwich approach include the fact that the system offers inherent insulation properties, does not rust or corrode and is basically immune from moisture uptake even if the uninstalled

modules are left exposed to the elements on the building site for a prolonged period of time.

## 3F ARCHITECTURAL BENEFITS

The composite panel can carry almost all kinds of façade materials such as stone, sheet metal, tiles or wood. You can also use the actual composite as a visible façade using a gel coat of any color.

As a new dynamic construction material it opens up a new way of thinking when it comes to free shapes and organic forms in contemporary architecture.

## JEC INNOVATION AWARD

Already the innovatory nature of this cladding system has been recognized by the JEC organization. At a special ceremony at the JEC Composites Show in Paris, March 2009, SG and DIAB was awarded the JEC Innovation Award 2009.

**SKANDINAVISKA GLASSYSTEM AB & DIAB**  
SG is a design build company on the international market for highly specialized glass and façade projects.

DIAB is a world leader in composite solutions and a global partner for major wind, aerospace & marine manufacturers.



Object: Horten Law Firm Architect: 3XN Architects, Copenhagen Comm.by: Pihl & Søn AS / Carlsberg Eiendom



”FREEDOM OF DESIGN”



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