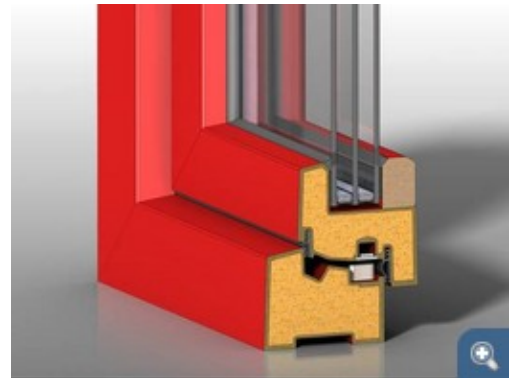


Thinner heat insulation with new window and facade constructions




The heat insulation requirements on buildings will only continue to be tightened. For exterior walls with heat insulation, this is basically not a problem. But for windows and facades it is conceivable that in a few years the requirements will only be met with triple-glazing or with vacuum-glazing which may be available by then. A research project will now develop particularly low thermal bridging constructions for the integration of extremely good thermal insulating and vacuum glazing for thin framework and facade structures. This project will look at glazing and framework structures as thermal and static units so that completely new approaches and concepts, functional connecting and sealing solutions and new and improved materials can be used for the frames. Initially, the researchers want to swiftly develop a construction for standard windows and introduce them to the market through participating enterprises and use them in new and refurbished buildings. Further applications with higher demand will be developed once the product is ready to be marketed.



Design study for the new frame structure with triple insulation glazing
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Technology summary

Formal project title	Highly-Insulating Window and Facade Systems (HWFF)
Term of project	08/2006 bis 01/2009
Technology status	 Demonstration Phase
Key aspects	Heat insulation, Facade systems, Glazing + windows

Project description

Efficient glazing puts frames on the spot: Architectural glazing is getting better and better, enormous heat insulation qualities can be achieved with modern triple or even quadruple-glazing. But these developments have their price – the window frames and facade systems must now take the increased weight of the panes with stronger constructions and, at the same time, must be able to keep pace with them in terms of heat insulation. The imperative of preventing thermal bridging is almost inevitably leading to greater profile strengths. Certainly, as for their sightline, the thermally improved frames can be produced to be just as lean as traditional constructions, and with over-insulation of the blind frame and thicker walls the greater profile strengths are less conspicuous.

However, there is demand for consistently optimised and, at the same time, thinner thermal framework and facade constructions.

Thinner framework constructions would also be very interesting for thin vacuum-glazing which will soon be technically possible: The evacuated glazing certainly reduces the static load on frames and facade systems, but because these also need to be thermally optimised here, the aesthetic problem of larger profile strengths is only slightly eased.

Focus

The research project, involving two scientific institutes and six industrial partners, will initially develop a marketable frame structure for standard windows. The entire manufacturing technology has yet to be developed and set up for serial production. Profiles, frames, casements and facade connections with the thinner construction should fall below a U-value of 0.8 W/m²K. This corresponds to a reduction in heat loss compared to state-of-the-art technology of around 50%. The warm and cold sides of the frame profiles will be thermally separated from one another, as far as possible. In order to achieve this, a continuous, vertical insulation level will be created. Both the surface characteristics (e.g. protection from the elements, optics) as well as the mechanical stability will be ensured by a suitable plastic cladding material which surrounds the insulated level.

The subsequent research work will concentrate on fixed facades, such as mullion-transom constructions and on portable systems, such as portable facade elements or skylights.

Successes

Profile

A thermally optimised profile has now been developed which achieves the desired Uf-value for the frame of 0.8

W/m²K with a profile width of only 90 mm. The first prototype windows have already been manufactured using an equally new manufacturing process. The new development, named 'TopTherm 90', went on show at the 'Fensterbau/Frontale 2008' trade fair in Nuremberg.

With this frame construction and triple glazing, it is possible to create windows suitable for use in passive houses with an U_w-value for the window of 0.8 W/m²K. It is even possible to achieve a value of 0.7 W/m²K using vacuum-glazing.

Initial calculations also show the very good static characteristics of the developed construction. The corresponding evaluations of the prototype profiles are ongoing.

Prototype production

The first prototype profiles were manufactured at the premises of the project partner BBG. The core is made of Polyurethane foam which ensures very good insulation characteristics. A form-stable and weatherproof plastic material encases the foam and, at the same time, guarantees the required mechanical characteristics as well as scope for altering the design of the shape and surfaces.

Manufacturing

A new kind of adhesive technology allows for the windows to be manufactured relatively simply and inexpensively. As the glazing and frames are also glued, they have an astoundingly high static capacity.

Milestones

The profile and frame constructions are currently undergoing the usual checks in terms of thermal and mechanical characteristics. Production is expected to begin in early 2009. Those involved in the project expect the product to be introduced on the market in 2010.

Application

Information on this subject will become available as the project continues



Project-Website HWFF



Projektinfo by BINE Information Service

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