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## Lightweight roof structures reduce heat losses

Textile and transparent membranes for refurbishing buildings

With many historic buildings and in specific urban situations it is not possible to span internal courtyards and similar spaces with glass roofs. Such roofs could help, however, to reduce the heat loss from buildings. Nevertheless new possibilities are provided by lightweight and highly transparent structures made from textile membranes. The newly published BINE-Projektinfo brochure "Lightweight envelopes for old buildings" (08/2012) presents the innovative concepts and components as well as their demands on the building management. The films and membranes can also be printed or equipped with thin-film solar cells, whereby the incident light can be controlled.

The textile materials can be used in the form of pneumatic cushions. Their air-filled cavities with an overpressure of 0.2 bar provide an opportunity to optimise the thermal insulation of buildings. Such lightweight roof structures can be achieved more cheaply than glass roofs. Various materials and coatings are now available in order to improve the thermal insulation of films and membranes. The researchers have investigated four application areas, whereby retrofitting roofs over atria has proved to be particularly promising. Corresponding concepts were developed for two buildings in Stuttgart and Munich. The work focussed on the problem of internal temperatures during the summer, the resulting temperature stratification and possible ventilation concepts. The subsequent use of the new space, i.e. whether temperate zones remain or a heated internal space is created, determines the possible energy savings.

An excellent example of a membrane roof is the Small Palace Courtyard in Dresden. The newly created space serves as a vestibule for the ticket counter and as a foyer for exhibitions. The BINE-Projektinfo brochure "Lightweight envelopes for old buildings" (08/2012), which can be obtained free of charge from the BINE Information Service at FIZ Karlsruhe, is available online at [www.bine.info](http://www.bine.info).

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