Fraunhofer IBP

Fraunhofer Institute for Building Physics IBP

Calorimetric façade and roof testing facility

Calorimetric façade and roof testing facility with built-in reference glazing
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The calorimetric façade and roof testing facility, which is located on Fraunhofer IBP's field test site in Holzkirchen, can be used to measure the energy properties of transparent building elements in-situ under real weather conditions.

While conventional laboratory test rigs usually only enable products to be evaluated on a reduced scale due to restrictions regarding the size and shape of test specimens, this testing facility can be used to study fullsize building components (max. 2.6 m × 3.5 m) such as façade elements, skylights or multilayer membrane cushion systems.

The testing facility is primarily used to measure total solar energy transmittance (g-value) and heat transfer coefficients (U-value) under real installation and weather conditions. For specific issues concerning local temperatures, air velocities, heat transfer resistance or deformation, or to assess light or glare, measurement sensors can be moved by a three-dimensional robot to different positions inside the test chamber.

The façade and roof testing facility is a large in-situ calorimeter that works according to the principle of a protective box. Based on the amounts of energy required to maintain a given internal temperature, conclusions can be drawn about a test specimen's energy properties.

The measurement chamber is highly versatile, allowing specimens to be examined in any direction and position between horizontal and vertical, or to be heliostatically tracked to follow the azimuth of the sun in order to ensure perpendicular radiation incidence.

Rotatable and tiltable test chamber with horizontal rotation option for examining the test specimen in any direction © Fraunhofer IBP

Installation of a multilayer membrane test specimen © Fraunhofer IBP

Services

- In-situ measurements of total solar energy transmittance (g-value) and heat transfer coefficient (U-value) of façade or roof elements under typical installation conditions
- Inclination-dependent and orientation-dependent measurement of g-values
- Analysis of the photometric properties of transparent building components
- Evaluation of glare situations dependent on inclination and orientation for sun protection systems
- Assessment of façades and building components
- Optimization of transparent components in terms of building physics
- Determination of the building physical behavior of skylights, membrane constructions, complex façade elements, transparent roof elements, etc. under real climatic conditions
- Development of test procedures and evaluation methods for novel building systems

Contact

Dr. Matthias Kersken
Tel. +49 8024 643-204
matthias.kersken@
ibp.fraunhofer.de

Herbert Sinnesbichler
Tel. +49 8024 643-241
herbert.sinnesbichler@
ibp.fraunhofer.de

Fraunhofer Institute for
Building Physics IBP
Fraunhoferstrasse 10
83626 Valley | Germany
www.ibp.fraunhofer.de

In contrast to measurements in the laboratory, our test facility can be used to measure transparent building components and their energy properties under real conditions.

www.pruefstellen.ibp.fraunhofer.de/facade-and-roof-test-facility