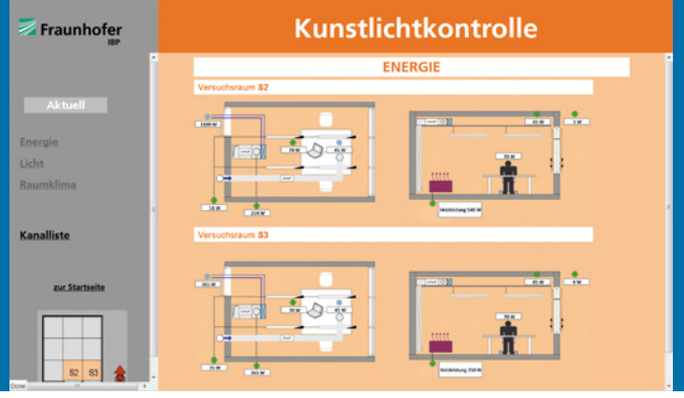
Fraunhofer IBP

FRAUNHOFER INSTITUTE FOR BUILDING PHYSICS IBP

VERU MODULAR
TEST FACILITY FOR ENERGY AND INDOOR ENVIRONMENTS



Options and Objectives

Particularly in the case of innovative complex façade systems, conventional laboratory test methods are often not accurate enough to determine key façade parameters required for the exact energy design of a building. Dealing with complex inhomogeneous constructions, characteristics that were determined from laboratory test samples can be transferred to the entire façade with some limitations only. To precisely assess the physical properties of such complex façade systems, laboratory measurements may now be enhanced by tests performed at the Modular Test Facility for Energy and Indoor Environments (VERU) at Fraunhofer IBP's Holzkirchen field test site.

VERU tests focus on the integral investigation of façades, spaces, and building services to give practical information on energy consumption, visual and thermal comfort.

The multi-storey building at the Holzkirchen field station allows to perform tests on conventional and innovative façade systems or building envelopes of almost any kind. The test cells behind the façade components are variable in depth. This modular design enables practice-oriented tests on a 1:1 scale under natural weathering conditions.

Building Services

Every storey of the three-storey reinforced-concrete test building contains six square test cells, which can be examined either individually or in combination (to study concepts of open-plan offices or meeting rooms, for instance).

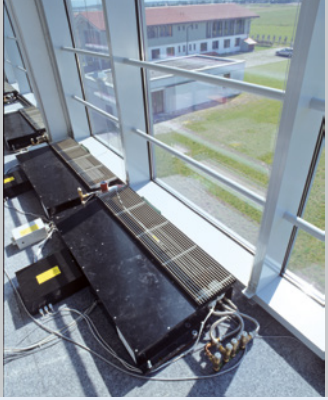
Due to the special construction (partially removable intermediate floors) it is also possible to investigate multi-storey rooms or halls. Partial areas of the solid intermediate floors contain embedded systems, allowing for a thermal activation of the concrete core. For testing purposes, façade components or shading systems can be attached to predefined fixtures at the east, south, and west front. Regardless of the specific experimental investigations to be performed, the test facility's basic equipment is very comprehensive, including

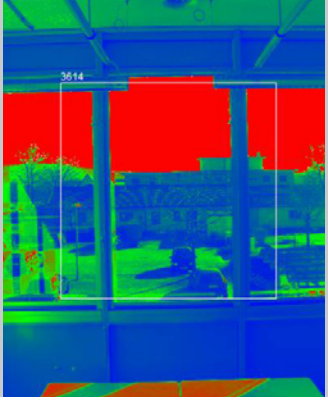
- a centralized domestic hot water (DHW) heating system with a gas-fired condensing boiler
- centralized cooling, chilled water network
- single-room, time-switched control of air change
- thermally activated slabs (concrete core activation)
- supply-air conditioning (incl. preheating, precooling, humidification and dehumidification)
- time-controlled, adjustable internal heat sources
- centralized open-process control system using innovative PLC software

Measurement Data Logging

Measurement data is collected by IMEDAS™ (a measurement system developed by IBP scientists), which also communicates with the central control unit.

- Centralized, real-time data logging and storage
- Real-time process visualization of measured data in a graphical user interface
- Optional, password-protected online access to visualizations (e. g. for in-house presentations or trade-fair demonstrations)
- Link between data logging and control systems. Any relevant system information will be saved in the central measurement database
- High reliability
- Measured data can be further processed using any given analysis software
- Internet-based access (web browsers) to all functionalities (process visualization, database access, evaluation templates, measuring channels, etc.)





Focus areas

- Integral assessment of innovative façade solutions
- Determination of total solar heat gains through the façade
- Determination of integral heat losses through the façade
- Assessment of façade-integrated building systems
- Product development, product optimization
- Analysis of the glare situation at the façade (Determination of luminance distribution)
- Determination of daylight factor
- Testing artificial lighting concepts
- Control performance of sun protection devices and artificial lighting systems
- Assessment of thermal comfort
- Performance of comparative tests in test rooms with identical orientation
- Material sampling of façade solutions to increase planning reliability for architects, designers, and builders
- Data processing to create and validate models for dynamic building simulations

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