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LABORATORY

Multifunctional Façade Lab

Laboratory for performance characterisation of multifunctional façades

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Experimental analysis is an essential approach for complex systems performance assessment in realistic working conditions, as well as for development of numerical models that can accurately predict the performance of building and its components. Our lab tests the thermal and energy performance of envelope systems such as doors and windows, opaque walls and façade modules under stationary and dynamic conditions.

Double chamber calorimeter with guard ring

Our tests are conducted in a calorimeter (double chamber with guard ring) coupled with a continuous sun simulator. By reproducing temperature, humidity, irradiation and air speed values, the two chambers of the calorimeter can emulate the actual operating environment of the outdoor and indoor side of the sample under analysis. The calorimeter was constructed in accordance with the ISO 8990 standard and is able to accommodate samples of up to 3 x 3 m with a maximum thickness of 50 cm. An extensive sensor system measures parameters such as thermal resistance and capacity. It also characterises the energy performance of passive and active envelope systems.

Artificial Sun and Hydraulic Circuit

Building envelopes can function as both energy producers and exchangers. Therefore, it is important to verify the behaviour of the entire system by reproducing their operating conditions. Our calorimeter setup has an artificial sun with continuous light and

a hydraulic measurement and control circuit to test samples with integrated PV panels, solar collectors and radiating elements. The auxiliary lab components measure energy flows and enable a comprehensive characterisation of the performance of complex envelope systems.

Company Service Expertise

Thanks to their international network of research institutes and industry partners, our experts are skilled in the fields of zero-energy balance buildings and buildings that are able to adapt to the dynamics of their context (i.e., flexible to reduce energy demand and to improve comfort through optimised management strategies). These skills extend to the development of technical-economic analyses that support investments in energy efficiency and optimise the quality and functionality of living and working environments.

This knowledge-base allows researchers to assist companies, designers and managers of buildings in development to characterise and optimise innovative building components and systems, as well as suggest construction and architectural solutions with an optimum cost/benefit ratio.

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