

M5.3, 5.4 Improvements on the measurement systems for advanced facades

WP5. Measurements, T5.2

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1 Introduction

The report briefly presents the measurements infrastructures and equipment available among the FACEcamp partners. For any more detailed information, please refer to direct contact with Eurac Research, Institute for Renewable Energy.

Among its various objectives, the FACEcamp project aimed at identifying a set of available procedures for the performance verification of complex façade systems throughout mapping and comparing the locally available measurements infrastructures and the underpinning methodologies.

2 Objectives

The current report has the objective to describe the main experimental setup and related improvements tackled by the FACEcamp partners, in order to narrow the gap between the façade system complexities and the standard measurement procedures. Existing measurement methods for visual characterization of shading and daylight systems have been analysed as well as new concepts have been investigated in a testing setup. The outcomes are inputs for further investigations to derive a generally accepted and standardized characterization scheme for complex façade systems. Convertible structures for indoor and outdoor test benches have been worked out and a universal applicable evaluation format (visual, thermal, comfort, control) defined. These results contribute to the development of a standardized method for model validation and calibration as well as an interchangeable data structure, which can be used for light and building simulation.

3 Methodology

The work has been done within FACEcamp WP5. The following steps were implemented towards a thermal characterisation (with and without solar radiation) of the façade systems, addressing specifically the following main aspects.

- Overview on existing measurement devices for complex façade determination within the consortium.
- Testing, calibration and further development of the different measuring devices
- Round-robin and cross-testing
- Development of synergies and activities of the experimental test bench at EURAC, UIBK and BB, improvement of measurement accuracy, Exchange of know-how

Starting with the scientific and technological background, the report will include different measurement possibilities investigated at Bartenbach, EURAC and University of Innsbruck. Such possibilities have been divided in groups as follow.

1. Overview on measurement devices
2. Devices and labs for the measurement of the g-value
 - a. @Bartenbach
 - b. @UIBK
 - c. @EURAC
3. Devices and labs for the characterisation of a façade system under outdoor boundary conditions
 - a. PASSYS cell @UIBK
 - b. Multilab cell @EURAC

4 Results

4.1 Overview on measurement devices

Given the rich variety of measurement devices and labs available within the FACEcamp consortium, a first output is the mapping of such tools and equipment in the trans-national region, focusing in the fields of indoor comfort.

The mapping is reported in the **Technical Annex 1** in the form of a set of dedicated tables per each project partner with available measurements devices.

4.2 G-value measurements

The g-value measurement can be tackled through dedicated laboratories and also in-situ, thanks to a recent development by UIBK. Both aspects are reported in the **Technical Annex 2**, with the experiences of EURAC, UIBK and Bartenbach.

4.3 Outdoor measurements

Different kinds of outdoor labs are available in Europe¹ as infrastructures to host dedicated testing campaigns on 1:1 envelope prototype with a controlled indoor environment. UIBK and EURAC has the availability of two different kinds of outdoor test bench, as explained in the **Technical Annex 2**.

5 Conclusions

Within the transnational region of South Tirol and Austrian Tirol, many different measurement devices and test benches are available to perform complex façade technologies characterisation (both at component and system scales). FACEcamp partners have deeply investigated current setups, improved them and mapped to facilitate the dissemination to the whole façade value-chain stakeholders. Performance verification through measurements for complex façade is still a very challenging field in which FACEcamp partners can play a role supporting design teams, companies as well as building owner with their measurement infrastructures.

¹ COST ACTION TU1043 Adaptive Façade Network http://tu1403.eu/wp-content/uploads/Vol-3-2_for-web-Open-Access_9789463661119.pdf

FACEcamp partners



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