ANALISI DELLE PERFORMANCE ENERGETICHE DI COMPONENTI DI INVOLUCRO MEDIANTE OUTDOOR TEST: EGUZKI E ILARGI PASLINK TEST CELLS

EGUZKI and ILARGI PASLINK TEST CELLS LCCE
Vitoria-Gasteiz

Ing. Carlos García-Gáfaro
Thermal Area
Laboratorio LCCE del Governo Basco

Scuola di Ingegneria
Università di Firenze
7 aprile 2016
The Laboratory: LCCE

Laboratory for the Quality Control in Buildings of the Basque Government LCCE

Physical-mechanical Area

Acoustic Area

Thermal Area
About us: We are a specialized team of researchers, engineers, architects and lectures of the University of the Basque Country UPV/EHU (ENEDI Research Group), promoting building energy efficiency by the Thermal Area of the Laboratory for the Quality Control in Buildings of the Basque Government LCCE.
Reasons for using PASLINK Test

Dynamic Thermal Response?
Solar gains?

Normalized Thermal Characterization of opaque and semi transparent solutions

Normalized Thermal Characterization of materials

ISO 8990
ISO 12567-1
EN 12667 / EN 12669
ASTM C-1114-06

ISO 12667 / EN 12669
ASTM C-1114-06
HISTORY

1985
PASSYS I
Belgium, Denmark, France, Germany, Italy, Netherlands, UK, JRC

1990
PASSYS II
Greece, Portugal, Spain

1992
COMPASS
Finland

1994
PASLINK

1994
PV-HYBRID-PAS

1996
IQ-TEST
Switzerland, ...

2000
DAME-BC
New member states
New sites in Spain, France, ...

2002
DYNASTEE Network

2005
DYNamic Analysis, Simulation and Testing
applied to the Energy and Environmental performance of buildings

2010
INIVE
International Network for Information on Ventilation and Energy Performance
Paslink Test Cells in LCCE – Vitoria Gasteiz
Outdoor Thermal Characterization using Paslink Test

WHY

HOW

WHAT
WHY a Paslink Test Cell Thermal Characterization?

The most similar methodology to a normalized test with clearly defined and proven equipment and procedures.

POWERFUL and RELIABLE tool

Outdoor Testing  Data Analysis  Modelling

Quality control
HOW Is a Paslink Test made?
Making the sample.

Example Test: Ventilated Façade with a glazed PV elements

1. Design of the sample.
How is a Paslink Test made?
Making the sample.

2. Zone construction for Wet or Heavy sample layers

3. Movement of the sample

4. Ending, sealing and connection of the sample.
Check of airtightness (<0.5 h⁻¹.)
HOW Is a Paslink Test made?
Test execution.

- PRBS (Pseudo Random Binary Sequence) or ROLBS (Randomly Ordered Logarithmically Binary Sequence) type heating signals are used during test to avoid correlated response in function of the exterior temperature.
- Reduction of the test duration
- Typical duration of the test: 2-3 weeks.
HOW Is made a Paslink Test Cell Thermal Characterization?
Test execution.
HOW is made a Paslink Test Cell Thermal Characterization?

Modelling.

Thermal model of the component

Extrapolation to simulation tools

Iterative process adjusting real and modelled values
WHAT Elements can be characterized in a Paslink Test Cell?

Examples.

ETICS solutions

Garden façade and roof

Façade with Phase Change Materials

Active greenhouse window

Ventilated Façades, light or heavy exterior layer
WHAT Elements can be characterized in a Paslink Test Cell?

Examples.

Social Housing Building with a type of Trombe Wall Solution in the Basque Country
WHAT Elements can be characterized in a Paslink Test Cell?

Examples.

- Trombe wall

\[ \eta \approx 57\% \]

\[ \Phi \approx 1.8 \text{ kWh/m}^2 \]
WHAT Elements can be characterized in a Paslink Test Cell?

Examples.

- Trombe wall

\[ \eta \approx 36\% \]

\[ \Phi \approx 1,4 \text{ kWh/m}^2 \]
**WHAT**

Elements can be characterized in a Paslink Test Cell?

Examples.

- **Trombe wall**

  \[ \eta \approx 61\% \]

  \[ \Phi \approx 2,6 \text{ kWh/m}^2 \]
WHAT Elements can be characterized in a Paslink Test Cell?

Examples.

- Trombe wall

\( \eta \approx 58\% \)

\( \Phi \approx 1 \text{ kWh/m}^2 \)
Application of Paslink Test Cell Results in a nZEB Building Social Housing Building of the Basque Government with “Free Heating”.
Application of Paslink Test Cell Results in a nZEB Building Social Housing Building of the Basque Government with “Free Heating”.
BUILDING SCALE Application of Paslink Test Cell Results in a nZEB Building Social Housing Building of the Basque Government with “Free Heating”.

“FREE HEATING” CONCEPT

Provide heating without any charge to the users

INFORMATION TO THE USER
Thank you very much for your attention

termica@euskadi.eus

www.euskadi.net/LCCE

Scuola di Ingegneria
Università di Firenze
7 aprile 2016