

Project status quo

EMIRIM

**Improvement of emissivity
measurements
on reflective insulation materials**

**An ongoing
prenormative research
project
of 2016 EMPIR Call**

CEN Need: CEN/TC 89/WG 12 “Thermal performance of buildings and building components”



- Submitted by: Carol Houghton - Convenor of CEN/TC 89/WG 12 “Reflective Insulation”
- Accurate and repeatable measurement of the emissivity of reflective insulation products which have very low levels of surface emittance, especially for values less than 0.05

Improvement of emissivity measurements on reflective insulation materials

B.2. Abstract

Emissivities of external faces of reflective insulation products must be measured to calculate thermal resistance (standard EN16012). CEN/TC 89/WG 12 expressed a demand for improvement of emissivity measurement because high discrepancies (0.06 for emissivity<0.1) were found in a comparison. The results depend on the technique of measurement and on the traceability (mirror, diffuse surface). A metrological study must be carried out: to improve existing primary techniques to get uncertainties about 0.02 for the calibration of emissivity reference samples, to quantify the performance of instruments used by end-users and to help CEN/TC 89/WG 12 to improve EN 16012 to allow end-users to perform measurements with uncertainty less than 0.03.

B.3. Keywords

Reflective, insulation, low emissivity, total hemispherical emissivity, thermal resistance.

B.4. Scientific and technological objectives

The overall objective is to enable the reproducible and traceable measurement of low values of total hemispherical emissivity of external faces of reflective insulation materials in response to the demand from CEN/TC 89/WG 12 (the working group responsible for defining test methods and declaration rules for thermal performance of reflective insulation products).

Overview of the project



Overall objectives of the project

EMIRIM:

Improvement of emissivity

Measurements on reflective insulation materials

Duration Juny 2017 - May 2020

Coordinator: LNE (France)

Consortium : 8 funded partners

➤ **4 EURAMET Metrology Institutes**

- LNE, France
- Aalto, Finland
- DTU, Denmark
- PTB, Germany

6 Other participants

FhG, Germany, FIW, Germany, IG, Italy,
ZAE Bayern, Germany, ACTIS, France, INGLAS,
Germany

- This project will address the needs of the standardisation group CEN/TC 89/WG 12 for improvement of the standard EN 16012.
- The overall objective is to enable end-users to perform SI traceable measurements of total hemispherical emissivity on low emissivity foils used in “reflective insulation” products with an uncertainty below 0.03.
- The targeted industry focuses on the production of thermal insulation materials.



Need for the project



- producers of reflective insulation products for buildings must declare values of emissivity for the products external surfaces. → inline with Directive 2010/31/EU
- Recent research has shown high discrepancies with total hemispherical emissivity results from 0.02 to 0.08 on the same reflective foil. urgent need for improvement of the accuracy of emissivity measurements of reflective foils.



Project objectives



- will test commercial emissivity measurement techniques to understand their limitations
- improve reference techniques at NMIs to lower uncertainties.
- will create reference samples and best practice calibration and measurement procedures which bring traceability to commercial instruments.
- results will be used to propose amendments to current standards EN 16012 and ISO 6946.

Expected impact on the stakeholder



Results of this project will:

- allow **developers of thermal insulation materials** to perform reliable emissivity measurements, and develop higher performance products. Such products will help improve energy efficiency in buildings, and also support other industries which use reflective foils, including aerospace, automotive, nuclear power, and packaging.
- allow **Standardisation bodies** to propose amendments to current standards EN 16012 and ISO 6946.

Some strengths that made project proposal successful



- Project well dimensioned and adapted to address the very specific need expressed with a planned budget of 0,5 M€ (while the projects of the other TPs are around 2 M€) and a small number of partners (only 8). The flexibility of the normative projects enable to build a targeted project focussing on a very specific need and a smaller consortium.
- The project address a well described need clearly expressed by the standardisation group to answer an industrial problem very well identified by its members.
- Close cooperation between the consortium and the standardisation group (LNE, member of CEN/TC 89/WG 12 and the Convenor of CEN/TC 89/WG 12 member of the stakeholder group of the project) ensuring a high impact of the project outcomes.

Thank you for your attention!

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