

## **How to maintain High Quality Level and Comparability of Thermal Conductivity Testing in Europe for Thermal Insulation Products**

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The paper describes the tools to maintain a high level of quality in testing and how to ensure comparable calibration level according to the European reference material. The detailed procedures for becoming a registered laboratory within the scheme for European certification mark called 'Keymark' is presented, besides also the results of the newer comparative testing performed during 2019-2021 compared with previous results since 2002.

The detailed set of Keymark scheme rules was developed by experts from the most respected European laboratories with especially focus on 'black box' Heat Flow Meter equipment (HFM), where some tests and verifications can be very difficult to perform with little or no access to internal parts of the equipment. The rules include technical 'educational' documents specifying that the individual laboratory must elaborate an equipment manual for the individual equipment including specific items as performance specification and performance check, uncertainty analysis, calibration and linearity, maintenance files, measurement procedure and maintaining of competences, besides equipment assessment. All the documentation is needed for the audit carried out by an expert from the Keymark scheme for approval. Besides the documentation participation in comparative tests are requested to become 'registered' (approved within the Keymark scheme).

When registered within the scheme participation in the comparative testing carried out every third year are requested to stay registered.

After introduction of the mandatory 'CE' conformity mark within the European Economic Area in June 2002 it became very important to ensure coordination of thermal conductivity testing within Europe with the highest priority on measurement uncertainty. This was established within the European Committee for Standardization (CEN) Keymark scheme for certification of thermal insulation products, which includes a detailed set of rules for laboratories performing thermal conductivity testing to ensure full transparency and a high level of competences within those laboratories, further setting up the comparative testing performed since 2001.

The Keymark scheme is voluntary working alongside the mandatory 'CE' conformity mark within the European Union and includes rigorous auditing and assessment of measurement capability, providing a high level of confidence in measured thermal conductivity values produced by registered laboratories. Information on the Keymark scheme can be found on the web-site: <http://www.keymark.eu>