

ISO 9972: An overview of difficulties with the current standard

Benedikt Kölsch^{1,2}, Valérie Leprince¹, Adeline Mélois^{2,3}

*1 Cerema
Dirrection Territoire et Ville
2 rue Antoine Charial
F-69426 Lyon, France*

*2 Cerema
BPE Research Team
46 rue Saint Théobald
F-38081, L'Isle d'Abeau, France*

*3 LOCIE
Université Savoie Mont Blanc
CNRS UMR5271
F-73376, France*

ABSTRACT

ISO 9972 is an international standard describing the measurement procedure and calculation methods for determining the air permeability of buildings using the fan pressurisation method (also known as the blower door test). In recent years, given the impact of airtightness on building energy use, more and more tests are performed, a lot of them required by regulations. When a target value must be reached in a mandatory context, controlling the test uncertainty is essential. However, experience and recent research have strongly underlined that the method described in this standard to measure a building's air leakage rate could be improved to increase its reliability. Indeed, environmental conditions during the test, more specifically wind and temperature changes, may cause a significant error and thus increase the resulting uncertainty.

To address these challenges, Cerema has set up a working group of international experts in the field of building airtightness testing to identify the issues with the current standard and propose improvements. This project aims to lay a foundation for a thorough review and revision of the current ISO 9972 standard.

While the general method shall remain the same, this working group has identified a comprehensive list of content that

- induces difficulties in performing the test,
- are inconsistent with other standards (e.g., national standards and ASTM),
- are unclear,
- impose unnecessary constraints,
- can be adjusted to decrease the test uncertainty.

The working group will provide a solution for each problem after coming to a general agreement on the proposed changes.

The contribution to this workshop will consist of presenting

- the list of issues identified by the working group to improve the current version of ISO 9972
- the reason behind the issues
- the first proposal on how to change parts of the standard.

This work shows the essential findings and most relevant issues that should be addressed, with particular attention to airtightness tests of high-rise buildings. Other important topics identified include, among other things, clarification of the maximum permissible error of measurement devices, test validity, pressure tap measurement location, zero flow pressure measurements, measurement duration, improvement of regression analysis and uncertainty calculations of flow rates and derived quantities.

Moreover, a roadmap will be delivered to further necessary steps to improve the standard. While the general process for testers shall not change, the ultimate goal is to propose a revised vision of ISO 9972 that

- allows performing the test in difficult conditions (windy, high-temperature difference, very large buildings, etc.),
- has a calculation process that is more reliable and allows to estimate the test uncertainty better,
- is more reliable in general and more consistent with other standards.

KEYWORDS

ISO 9972, fan pressurisation method, uncertainty