

Building and ductwork airtightness in the Czech Republic: national trends and requirements

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FOREWORD

The AIVC is preparing a series of VIP on national regulations and trends in airtightness for various countries (numbered VIP 45.XX), detailing for both building and ductwork airtightness:

- the national requirements and drivers (regulations, incentives, justifications and sanctions)
- whether it is taken into account in the energy performance calculations and how;
- the test protocol (testers qualifications, national guidelines, requirements on measuring devices);
- the tests already performed and whether there is a results database;
- key documents.

This presentation focuses on the airtightness trends in the Czech Republic.

BUILDING MARKET

The Czech Republic is a country where building industry has significantly changed over the past 30 years including the attitude on the building and ductwork airtightness.

The estimated number of the residential buildings in the Czech Republic is 2.4 million according to the data of the Czech Statistical Office. This figure includes single-family houses, multi-family residential buildings and other long-term residences e.g. students residences, children's homes, retirement homes, cloisters, etc. as well as non-residential buildings with dwellings. About 50 % of the residential buildings were built or renovated between 1946 and 2000, approximately 25 % before 1946 and 25 % after 2000. Relevant data about the number of the non-residential buildings are not available.

On average, 51 000 building permits are issued yearly for new construction or renovation of buildings. The permits for the residential buildings represent approximately 2/3 of the total number, permits for the non-residential buildings represent the remaining 1/3. Among the permits for the residential buildings, about 50 % represent new construction and 50 % renovations. Among the permits for the non-residential buildings, the share of new construction is about 40 %.

The average number of the single-family houses and multi-family residential buildings commissioned yearly is approximately 16 500. About 6 % of these buildings are rated energy performance class A. The yearly average of the commissioned new non-residential buildings is approximately 1 500.

BUILDING AIRTIGHTNESS

During the last 2 decades, the excessive air leakage has been recognised as an important factor with a negative impact primarily on the energy efficiency of buildings and on the hygrothermal performance of building envelope structures (nevertheless, the relationship between the building airtightness and ventilation seems rather underestimated). Building airtightness

requirements were integrated into the technical standard specifying general requirements on the thermal performance of buildings. Nevertheless, the justification of compliance by means of systematic airtightness testing has never become mandatory, mostly due to the concerns about an increase of administrative burden, increase of costs, complications of the construction process (learning process, reparations after a failed test, etc.) and unreadiness of the market to a sudden change (lack of the skilled workmanship and the qualified testers and designers).

The state energy performance programme providing financial support for construction of energy efficient and airtight buildings has considerably increased the awareness about the building airtightness and has stimulated a progress in knowledge and skills of the building professionals. On one hand, the success of the energy performance programme proved that the building market can deal with the new challenging situation such as mandatory airtightness testing with no major problems, at least in a particular segment of the building industry. On the other hand, the lessons learned have clearly pointed out a need of a solid regulative framework for the implementation of the systematic mandatory airtightness testing:

- correctly defined requirements
- detailed guidelines for the testing
- detailed procedures for the compliance check
- detailed rules for the control of the testers qualification including a system of supervision aimed at avoiding frauds and illegal practice

Nowadays, a significant effort is being made to collect the requirements and testing guidelines spread over different documents, revise and update their content and integrate them into the system of the Czech technical standards. The results of this attempt would provide a unified regulative framework ready for a general use. With this aim, the requirements of the standard ČSN 73 0540-2 are revised, and linked with the new standard ČSN 73 0515 providing with detailed testing guidelines and, alongside, a more complex competent tester scheme has been prepared.

An effort is needed to convince the state authorities that it is advisable to stimulate improvements of the building airtightness in a large scale in order to achieve the targets of energy efficiency and sustainability in the building sector. The experience from the energy performance programme shows that mandatory justification of compliance with requirements by means of systematic testing is an efficient and feasible approach. If this option was chosen, it would seem reasonable to implement the mandatory testing of different building types progressively. A preceding information campaign and educational programmes for all the concerned building professionals seems to be highly advisable in order to avoid the long process of learning of one's own mistakes.

DUCTWORK AIRTIGHTNESS

Despite the importance of the airtightness of air ducts, there are neither general guidelines nor national regulations. In the future, it would be appropriate to develop general recommendations and ensure that those carrying out practical installations are better informed. State regulation would not be beneficial in view of the large number of regulations already in place. It is expected that the specific requirements and their fulfilment will govern the relationship between the supplier and the purchaser of the duct system.

In the Czech Republic there are standards and associated airtightness tests and certifications for the placing on the market of individual air duct products. However, these do not consider the actual installation. The only and very brief guide for on-site measurement is provided by standard EN 12599.

KEYWORDS

Building airtightness, ductwork airtightness, regulation, trends, Czech Republic