

Foreword

The concern for building and ductwork airtightness continues to grow in Europe and many other parts of the world. While there are decade(s) of experience in countries such as Germany and the UK on tight building envelopes and over 50 years of experience in Scandinavian countries on airtight ductwork, there are both a great need to share this experience in a constructive way and an opportunity to seize with the EPBD recast to investigate new paths for product development, construction methods, commissioning, and building operations.

The successful events organized by TightVent as well as its growing network with the airtightness testers association committee and new partners reinforce this statement and encourage us to go further.

Please note the following events

- AIVC-TightVent workshop on the quality of residential ventilation systems in Brussels on March 18-19
- AIVC-TightVent airtightness workshop in Washington DC on April 18-19
- BUILDAIR symposium, Hannover, Germany, June 7-8
- 34th AIVC conference and 3rd TightVent conference in Athens on September 25-26.

Peter Wouters, *Manager INIVE EEIG*



Airtightness track of the 2012 AIVC-TightVent conference

By Arnold Janssens, *University of Ghent, Belgium*

The airtightness track at the AIVC conference consisted of 29 presentations organized in 7 sessions. In 3 sessions research work was presented dealing with various airtightness related aspects as requested in the call for papers. In 4 sessions invited presentations and structured discussions were offered to give an overview of some specific conference topics:

- Ductwork airtightness

- Quality and building airtightness
- Quality of domestic ventilation systems
- Philosophy and approaches for building airtightness requirements

The paper available at www.rehva.eu/en/668.summary-of-the-aivc-tightvent-conference-2012 gives a bird's eye view of trends and conclusions that appeared in the presentations and discussions in the airtightness track as well as the other tracks of the conference.



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New publications

REHVA Journal Issue n°2013/1

The January 2013 issue of the REHVA journal was prepared in close collaboration with TightVent and gives special emphasis to building and ductwork airtightness with the following articles:

- ✓ Building and ductwork airtightness – a critical factor for nearly zero energy buildings – François Rémi Carrié and Peter Wouters
- ✓ Summary of the AIVC-TightVent conference 2012 – Willem de Gids, Per Heiselberg, and Arnold Janssens
- ✓ Interview: Industry visions on R&D for better buildings in the future – Lone Feifer, Claus Bugge Garn, Lars-Ake Mattsson
- ✓ Proper building preparation for envelope airtightness testing – Christophe Delmotte
- ✓ Performing intermediate checks and early-stage testing of airtightness – Tormod Aurlien
- ✓ Research into the effect of improving airtightness in a typical UK dwelling – Rob Coxon
- ✓ Swedish experience with airtight ductwork – Johnny Andersson
- ✓ Ductwork airtightness requirements in Portugal – Eduardo Maldonado and Fernando Brito
- ✓ Evaluation of air leakage and its influence on thermal demands of office buildings in Madrid – Jordi Pascua, Aleksander Ivancic, Maria Casanova, Oscar Camara and Damien Tavan

Download and read the papers at www.rehva.eu/en/01-2013

TightVent reports

TightVent is pleased to have contributed in close collaboration with the AIVC to the production of the following two reports:

- ✓ Building airtightness: a critical review of testing, reporting and quality schemes in 10 countries
- ✓ Building air leakage databases in energy conservation policies: analysis of selected initiatives in 4 European countries and the USA

Find them at www.tightvent.eu

TightVent's airtightness testers associations committee

TightVent has set up an airtightness tester's associations committee whose aim is to bring together airtightness testers associations. Since September 2012, the committee has met twice (via internet) and 2 additional meetings are scheduled in the first semester of 2013 (a physical meeting is planned in Hannover on June 6, i.e. one day before the BUILD UP Symposium). At present, the participants are from Belgium, Czech Republic, Denmark, France, Germany, Italy, Sweden, and the UK.

The scope includes various aspects including:

- ✓ airtightness requirements in the countries involved
- ✓ competent tester schemes in the countries involved
- ✓ applicable standards and guidelines for testing
- ✓ collection of relevant guidance and training documents

In case you have interest to obtain information, please write an email to info@tightvent.eu

TightVent is very pleased to welcome AeroSeal, solution provider for ductwork sealing for new and re-used systems, as new partner

AeroSeal offers an effective solution for testing and sealing ductwork leakage from the inside using a water-based sealant. The AeroSeal application is capable of sealing new and existing ductwork in commercial and residential buildings. AeroSeal's aerosol ductwork sealing technology was invented and developed at Lawrence Berkeley National Laboratory in 1994. AeroSeal is looking forward to creating a long lasting relationship with TightVent Europe, and maintaining high efficiency within buildings.



Airtightness and ventilation of modern Estonian apartments

Targo Kalamees, Leena Paap, Alo Mikola, Teet-Andrus Kõiv, Tallinn University of Technology, Estonia

This article is based on the paper of the same authors presented at the 2012 AIVC-TightVent conference. Tightening requirements on energy performance of buildings and indoor air quality set higher demands on performance of ventilation and airtightness of the building envelope. Airtightness of building envelopes directly affects indoor quality (health, thermal comfort), hygrothermal performance, noise and fire resistance, and energy consumption of the building. To guarantee indoor air quality, the performance of ventilation in airtight buildings is an important issue. A good principle regarding the balance between airtightness and ventilation is: « build tight — ventilate right ».

The overview of the final performance of the ventilation and airtightness of the building envelope, 63 apartments from 28 buildings were investigated in a cross-sectional study of the technical condition of recently built apartment buildings. Buildings were selected with different external wall structures and with different ventilation systems to represent an average of recently built Estonian apartment buildings.

The mean air leakage rate at the pressure difference of 50 Pa in the database was $1.7 \text{ m}^3/(\text{h}\cdot\text{m}^2)$, the minimum being $0.8 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ and the maximum $4.6 \text{ m}^3/(\text{h}\cdot\text{m}^2)$, see Figure 1 left. The mean air change rate at the pressure difference of 50 Pa from all the data was 2.3 h^{-1} (minimum being 0.9 h^{-1} and the maximum 6.6 h^{-1}). Airtightness measurements showed only a small difference between different building types ($q_{50}=1.5\dots2.2 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ and $n_{50}=2.2\dots2.7 \text{ h}^{-1}$). Figure 1 (right) shows that it is possible to build reasonably airtight building envelopes within all types of structures. Large deviations within the same building type show that the quality of construction work is a key aspect. Also typical air leakage distribution indicates that poor

workmanship quality is the main reason behind low airtightness performance in our sample, rather than low-grade building products. In general, airtight materials and good workmanship play an important role in order to achieve high airtightness of building envelopes.

The performance of ventilation was assessed at apartment and bedroom levels. Indoor climate category II (EN 15251: normal level of expectation and should be used for new buildings and renovations) was selected as reference.

Ventilation airflows in apartments were low in general (Figure 2 left) resulting in high CO₂ concentration (Figure 2 right). Only in a few apartments the general airflow corresponds to the requirements of indoor climate

category II (>0.42 l/(s·m²)). Even average general airflow (0.3 l/(s·m²)) was below the indoor climate category III target value (>0.35 l/(s·m²)).

Based on measurements of indoor CO₂ levels and estimated CO₂ (as tracer gas) emissions from residences during the night (≈20:00...8:00), the air change in bedrooms was estimated. The required airflow for two-person bedrooms (14 l/s) was met only in 26 % of bedrooms during winter. Probably due to window airing during summer, this airflow was met in 44 % of apartments.

In addition to design and construction of ventilation system, occupant behaviour also affects the ventilation airflow. The main reasons why people decreased the ventilation airflows to the lower speed were:

- Poor thermal comfort - taking outdoor air through the external wall without preheating did not provide thermal comfort (low temperatures, draft),
- Increased energy use - because heat recovery was not used, it resulted in larger energy bills,
- Noise problems - They may prevent the use of ventilation in a proper way, in particular with exhaust fans located indoors (bathroom, WC, kitchen), which is often the case.

Together with the increase of the air tightness of building envelopes more attention should be paid to the real performance of ventilation. The ventilation system airflow rate is not the only concern. Other performance aspects including noise, draft, and energy use must also be considered.

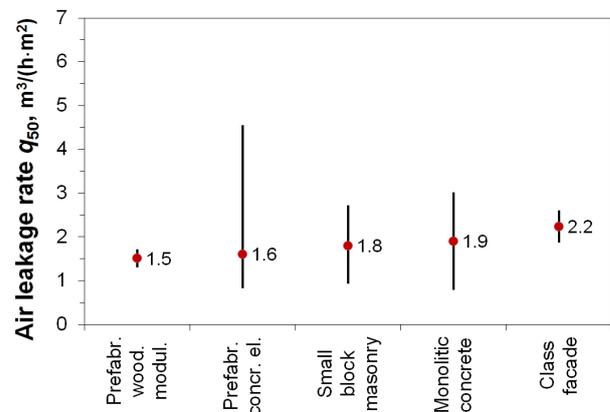
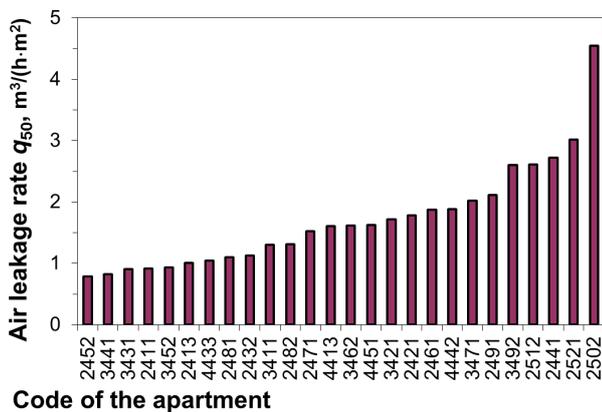


Figure 1. Air leakage rate q_{50} (left) and air change rate n_{50} (right) of all apartments.

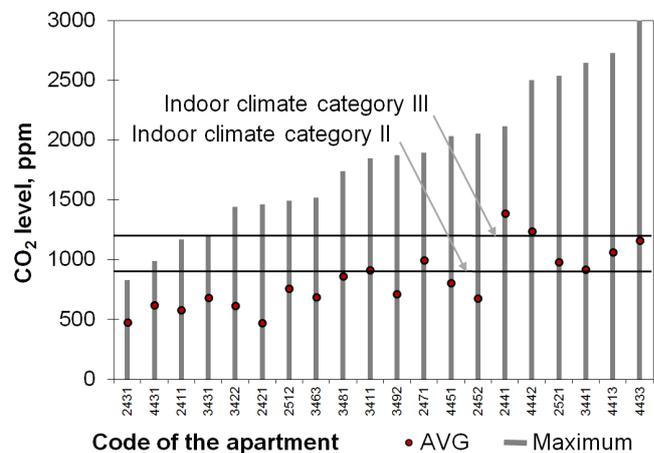
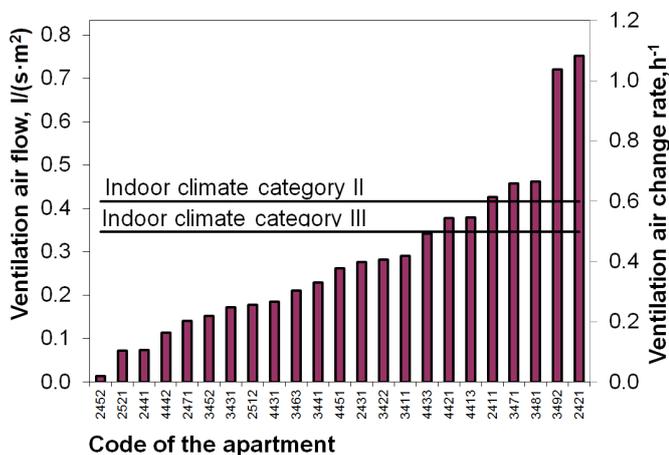


Figure 2. Air leakage rate q_{50} (left) and air change rate n_{50} (right) of all apartments.

Workshop on “Securing the quality of ventilation systems in residential buildings: status and perspectives” in Brussels, Belgium, 18-19 March 2013

The objective of this workshop is to discuss pros and cons of existing approaches as well as ways to explore to improve the situation with key experts from various countries. The focus of the presentations is on the schemes developed to secure the quality of the ventilation systems in residential buildings. This entails in particular the development of quality labels and performance display for products, qualification schemes for installers, design and installation guidelines, and training for designers and craftsmen, as well as the implementation of commissioning protocols, maintenance protocols, regular inspections and real performance measurements.

More information is available on the TightVent website (tightvent.eu/events/qvs-workshop-2013).

This event is organized with the technical and/or financial support of the following organizations:



Airtightness workshop in Washington DC, 18-19 April 2013

The workshop will include presentations from several countries on a variety of issues, approaches and solutions in their different contexts. Presentations will emphasize recent developments in test methods, building airtightness performance data, approaches to design, construction and commissioning that contribute to good airtightness performance, and the development of airtightness requirements in codes, standards and regulations. While much of the discussion will focus on commercial and other high-rise buildings, the workshop will also address residential buildings.

More information on www.nibs.org/events/event_details.asp?id=280378

This event is organized with the technical and/or financial support of the following organizations:



BUILDAIR symposium, Hannover, Germany, 7-8 June 2013



Following the successful symposium held in Berlin in 2011 and 2012, TightVent is very pleased to pursue its collaboration with BUILDAIR. The 8th International BUILDAIR-Symposium “Airtight Buildings, Thermography and Ventilation Systems in Practice” offers a variety of presentations and firsthand accounts of experiences in planning and practicing air tightness measurements, quality controls, thermographies and ventilation systems. More information on buildair.eu

AIVC conference 2013 in Athens, Greece, 25-26 September 2013

The 34th AIVC conference will be held in Greece in conjunction with the 3rd TightVent conference, 2nd Cool Roofs' conference, and 1st venticool conference. It will be the major international event on airtightness in 2013 with one track dedicated to infiltration and ventilation, including topical sessions on building and ductwork airtightness. Best papers will be considered for full publication in peer reviewed scientific journals. Visit the conference website www.AIVC2013Conference.org for further information.

Conference organizers:



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