

Airtightness of buildings and ductwork: The Tightvent Europe Platform

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Building and ductwork airtightness represent a key challenge towards very-low energy buildings and therefore towards the ambitious 2020 targets set in the recast of the energy performance of buildings directive. Results of the EU ASIEPI project (www.asiepi.eu, [6]) have shown that for most European climates, leaky envelopes and duct systems have a severe impact on the total energy use of the building, e.g., on the order of 10 kWh per m² of floor area per year for the heating needs in a moderately cold region (2500 degree-days) and 0 to 5 kWh/m²/year for the ducts plus the additional fan energy use [2][10]. Few European countries have taken steps to overcome this challenge, but whether good or bad, their experience is worth sharing to accelerate the market transformation needed on these issues [4][8][9].

This paper gives an overview of the TightVent Europe platform that started in January 2011 and its scheduled activities for year 2011. More information can be found on the TightVent Europe website (www.tightvent.eu).

Challenges for nearly-zero energy buildings

The EPBD recast [1] sets ambitious targets for year 2020 including the obligation for EU countries to implement regulations to increase the number of nearly zero-energy buildings (NZEB) in the next few years, and to generalize nearly zero-energy targets in new buildings and major renovations. Therefore, as illustrated in **Figure 1**:

- Because of the demonstrated energy impact of envelope and ductwork leakage, the implementation of the EPBD recast will for most climates automatically lead to specific attention to building airtightness (1);
- As a result of the increased attention for building airtightness, the need for appropriate, energy efficient, ventilation systems (2) will grow. Issues such as correct airflow rates, air quality, acoustics, draught, energy optimisation, economics, etc. will have to be handled. At present, we know that poor ventilation system performance is common in many European countries.

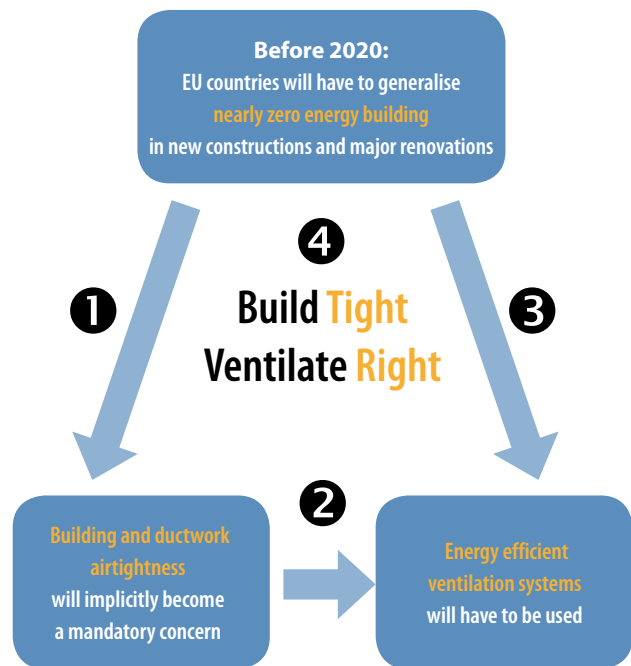


Figure 1. Diagram representing interactions between energy targets, ventilation, and airtightness.

- Indirectly, the move towards nearly zero-energy buildings will lead to a greater need for ventilation systems, whether mechanical, natural or hybrid (3).
- In addition, there are tremendous challenges for the existing building stock. Although there will be in most countries more time for implementation and, in absolute terms, probably less severe targets, in addition to challenges similar to the new stock, there are specificities that considerably complexify the improvement of ventilation and airtightness.

What is TightVent Europe?

Since there are to a rather large extent similar challenges for the whole of Europe, the TightVent Europe platform aims at meeting the obvious need for a strong and concerted initiative to overcome these challenges. Indeed,

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sharing experience on practical issues such as specifications, design, execution, control, ... and taking advantage of the lessons learnt from pioneering work will help improve airtightness quality while keeping in mind the need for adequate ventilation.

TightVent Europe has been initiated by INIVE EEIG (International Network for Information on Ventilation and Energy Performance) with at present the financial and/or technical support of the following partners: Building Performance Institute Europe, European Climate Foundation, Eurima, Lindab, Soudal, Tremco-Ilbruck, and Wienerberger. All partners are strongly interested in setting up a European wide collaboration and using the knowledge gathered through TightVent Europe for raising the awareness among all building professionals, for developing improved training courses, and for helping professionals in the development of quality management approaches. The partners also believe that there are areas that need further investigation (for example, the durability of seals, the integration of airtightness and ventilation issues in renovation projects, the variability of the energy impact with climate, etc.) where TightVent Europe can play a major role both in terms of research development and dissemination.

The target audience of the TightVent Europe activities is wide and ranges from the research community over designers, practitioners, supply industry to European, national and regional government policy makers. It is clear that awareness raising is key in the starting up phase, whereas in time the emphasis should move to providing the appropriate support tools and getting the knowledge into the market.

Envisaged deliverables of tightvent europe **A project-oriented platform involving expert organisations from various countries**

One key concept of TightVent Europe is to organize or encourage efforts in a consistent manner around specific topics, e.g., to develop a philosophy on airtightness requirements, to encourage the development of airtightness networks, to improve and encourage quality management. For this, TightVent will make use of its network of re-known specialists around the world and will put forward synergies between national initiatives. For instance, on the subject of airtightness requirements, this might take the form of a project involving a group of experts from various countries with a series of workshops and webinars including lessons learnt from national approaches. The foreseen publications, conferences, webinars, and BUILD UP community described below fall under this project-oriented approach, i.e., they are linked to project deliverables.

Publications under preparation

A publication on the challenges for building and ductwork airtightness is foreseen in spring 2011. It will include an introductory paper browsing the issues of concern and collect a series of technical documents, namely those produced within the ASIEPI project as well as within the SAVE-DUCT and AIRWAYS projects [1][5].

We are also working on a more extensive publication that will give an overview of envelope airtightness issues and policies to achieve a market transformation. It is primarily targeted at policy makers, but it will include relevant information for building professionals such as project owners or managers or consultants as well, for instance on energy and indoor air quality issues associated with airtightness.

Two major conferences in Berlin (May 6) and Brussels (October 12-13)

One important aspect of TightVent Europe's strategy is to bring added-value to existing initiatives rather than duplicating efforts. One illustration of this strategy lies in the partnership established with the BUILDAIR conference, which was held in Berlin, May 6. This conference has been for a number of years a major event on airtightness issues in Germany (www.buildair.eu) and has more recently drawn attendees from several European countries. The association with TightVent Europe is expected to bring more visibility of this conference at EU level.

TightVent Europe is also combining forces with the Air Infiltration and Ventilation Centre (AIVC — www.aivc.org), which is the IEA information centre on energy efficient ventilation. In practice, the 32nd AIVC conference, which is *the* major international event on air infiltration and ventilation, is combined with the 1st TightVent conference. The programme includes 2 parallel tracks:

- One track focusing on airtightness related issues;
- The other track addressing ventilation issues in general.

The conference will consist of a mixture of:

- Well-prepared workshops (typical duration 1.5 hours);
- Presentations on invitation;
- Presentations from call for papers.

The deadline for abstract submission is May 15.

Webinars

Besides the publications, conferences, and BUILDUP community mentioned above, TightVent Europe key activities in 2011 will also include the organization of webinars. Some will be targeted at a specific region (the first webinar will be specifically focused on Romania), some at the specific topic (e.g., sharing national experience on air leakage databases), some at training, some at industry.

BUILD UP community on airtightness of buildings and ductwork

Today, there is for many issues of interest not a lack of information but, at the same time, it is for most professionals difficult to easily find the information one is looking for. The BUILD UP platform (www.build-up.eu) is the official EU platform on energy efficiency in buildings, and TightVent Europe is actively supporting this through facilitating a community on the "Airtightness of Buildings and Ductwork". Part of the information in BUILD UP can also be accessed on www.tightvent.eu.

Scientific committee and AIVC collaboration

In order to guarantee high quality deliverables and an unbiased view, the TightVent scientific committee has been set up, with as primary objectives:

- To pay attention to the overall scientific approach of the platform;
- To take care of a correct balance between energy concerns and indoor climate concerns;
- To organise a review process for publications and to give advice to the steering committee.

It is made of internationally re-known individuals in the field of energy efficient ventilation and infiltration. In a concern for efficiency and focus, some of these experts are also members of the Air Infiltration and Ventilation Centre (AIVC).

Conclusion

The TightVent Europe platform has already initiated a number of activities in its starting up phase since January 2011, ranging from the organization of two international conferences in 2011 to the preparation of publications and webinars, including the dialogue with users and stakeholders. Its ambition is to play a major role in dissemination and research activities on airtightness and ventilation issues, namely by bringing added-value to existing initiatives, gathering experts around common concerns, and producing reference documents. This way it will contribute to the obvious need for international collaboration on building and ductwork airtightness, which is a major challenge for

EU countries to reach the 2020 targets. For more information, visit the TightVent Europe website at www.tightvent.eu.

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