

Foreword

Improving building airtightness is not at all about reducing the amount of fresh air provided to remove indoor pollutants; it is about controlling airflow rates so that ventilation systems (whether natural, hybrid or mechanical) function properly and without wasting energy. Of course, this means both the building airtightness and ventilation have to be properly designed and implemented. Scandinavian countries were known to be quite advanced on ventilation systems, including regarding the airtightness levels commonly achieved in these countries compared to the rest of Europe. The recent Belgian, British, and French initiatives to improve the quality of ventilation systems including checks of airflow rates or ductwork airtightness are positive developments in this direction.

The "airtightness" workshop held during the Clima 2016 and co-organised by TightVent was the occasion to discuss these aspects, but also more broadly the status and research needs in the field of building and ductwork airtightness. This newsletter also outlines interesting initiatives with regard to quality of the works and compliance, building airtightness design, and residential ventilation and health. We wish you a pleasant reading.

The TightVent team

Progress made on building and ductwork airtightness in the past 5 years

Significant progress has been made over the past 5 years to improve building airtightness, but there remain challenges to consider long term performance or to contain risks of inappropriate ventilation. As for ductwork airtightness, except for Scandinavian countries, we are still at a stage where awareness raising is sorely needed.

Building and ductwork airtightness are key factors for achieving nearly zero-energy buildings. Looking 5 years behind, it is clear that significant progress has been made in several European countries with regard to building airtightness. On the other hand, this concern is still lagging behind in many regions and/or building sectors, although relevant in terms of energy savings and indoor environmental quality. In addition, very few European countries have taken steps to foster airtight ductworks.

To address these concerns, TightVent Europe, the AIVC and QUALICheck supported the organisation of a 90-

minute workshop during the Clima 2016 conference. Discussion was based on the analysis of answers to prepared questions asked to the audience, preceded by a series of short presentations to introduce those questions. Answers were collected instantaneously with a voting system and are briefly summarised below.

Building airtightness

The motivations for considering building airtightness include the energy use impacts, IAQ, building damage and safety. Energy remains the main driver, but the voting results confirmed increasing concerns for effective implementation of adequate ventilation provisions where additional research is needed.

Significant policy changes with regulations or programmes requiring building airtightness testing or strongly pushing better building airtightness were highlighted, stressing the need for competent testers, clear calibration rules, robust test methods in windy conditions or for multi-zone buildings, etc.

Also, participants recognised that durability of products and assemblies should be better considered to secure airtightness levels in the long term, but it



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was unclear from the discussion which methods should be prioritised to address this problem. This subject had been a key research area in the 80s, but without clear results in terms of methods to characterise or improve building airtightness durability. Since about 2010, there seems to be a revived interest for this topic, which is good, since there is no standardised method to assess or specify building airtightness long term performance. While the audience preferred characterisation based on complete assemblies, it is unclear how this can be done in practice given the numerous combinations of product/structure/workmanship that should be tested. Also, while a combination of stress cycles based on field observations and unfavourable humidity and temperature conditions seem preferable to assess the degradation of product performance, testing costs need to be carefully evaluated.

Ductwork airtightness

On the topic of ductwork airtightness, the participants recognised that field data is sparse. The SAVE-DUCT project remains a reference for the ground status although the data is now over 15 years old. There was a clear consensus on the need to gather and consolidate more field data, building on the increasing number of tests performed in several countries. The workshop participants also clearly agreed on the fact that, although a number of studies demonstrate the large energy implications of duct leakage, the methods used to quantify these implications need to be evaluated as a first step towards a standardised method, building upon FprEN 16798-5-1.

Reduction of airflow rates at ATDs, contaminant transfer from dusty areas, increase of dust accumulation in filters, heat exchangers, ducts, etc. were all considered as priority research areas in terms of IAQ impacts of duct leakage.

The market incentives towards better airtightness seem weak in most

countries, with few exceptions, for instance: Scandinavian countries where requirements have been commonly used and met for several decades; or more recently, UK and France, where airtightness testing is required for specific systems (UK) or when applying for Effinergie+ label in France.

The participants acknowledged industry efforts to improve ductwork airtightness, for instance with the development of duct-mounting without screws, factory-fitted seals for rectangular ducts, or semi-rigid ducts with joint-fitted components. On the other hand, there is a clear need for solutions for existing ductwork—only one technology is commercially-available specifically to seal existing ductwork.

Conclusions and perspectives

In summary, looking 5 years behind, there is a striking contrast in the evolution of the regulatory landscape and field practice between building and ductwork airtightness. On envelope issues, some countries have experienced a radical change, in particular when airtightness testing has been encouraged. Still, there remain many challenges to consider of long-term performance, to contain risks of inappropriate ventilation provisions, or to monitor the implementation of policies with field data. On ductwork issues, we should be concerned with stable poor performance observed in the field despite the availability of high-performing products and methods for new installations. Research is clearly needed to address this problem which should involve consolidation and analysis of field data, standardised methods for impact assessments, development and evaluation of policy scenarios, and development of methods to reduce leakage of existing ductwork systems.

Presentations and voting results of this session are available on the [REHVA website](#).

September 12-14, 2016: 37th AIVC –ASHRAE- IAQ joint conference Alexandria, VA, USA

This joint conference will provide a unique opportunity for dialogue among attendees to facilitate understanding of current indoor air quality policies, standards and best practices with themes such as regulatory vs. voluntary compliance for achieving Indoor Air Quality (IAQ), the role of IAQ in sustainable building programmes and the relationship between IAQ and Indoor Environmental Quality (IEQ), etc.

The conference programme will include internationally acclaimed keynote speakers, original peer reviewed papers, the latest in indoor environmental quality control, plus workshops and panel discussions.

This conference will guide the researchers, experts, policy makers, building owners and operators, engineers, designers, IAQ professionals, commissioning agents, architects and other interested participants about what works and what really doesn't work when tackling major improvements in indoor air quality. Target facilities include residential and non-residential buildings.

The event will cover the following themes and topics among others:

- Definitions and metrics
- Regulatory vs. voluntary compliance for achieving IAQ
- IAQ certification programmes
- Low energy/high performance buildings and IAQ
- IAQ in sustainable building programmes
- Interactions—IEQ, climate change, energy efficiency
- Monitoring
- Best practices
- Ventilation and infiltration

- Residential IAQ standards and policies
- IAQ in Developing Economies
- IAQ in mobile environments— aircraft, trains, ships, motor vehicles

Please visit:

<https://www.ashrae.org/membership--conferences/conferences/ashrae-conferences/iaq-2016> for more information.

New QUALICHeCK factsheets available

QUALICHeCK recently released several new Fact Sheets:

- FACT SHEET #09 | AMA – General material and workmanship specifications
- FACT SHEET #08 | Quality control of Stuttgart's retrofit standard realised by the city's energy consultancy office
- FACT SHEET #07 | Building airtightness in France — regulatory context, control procedures, results
- FACT SHEET #06 | Regulatory compliance checks of residential ventilation systems in France
- FACT SHEET #05 | Voluntary scheme and database for compliant and easily accessible EPC product input data in Belgium
- FACT SHEET #04 | European voluntary rating programme of cool roofing products

The documents are freely accessible and browsable by date and topic at:

<http://qualicheck-platform.eu/results/fact-sheets/>

FliB releases guidelines and a database of construction details

The guidelines walk through the design and implementation of an airtightness concept and address the following aspects in new built and refurbished single family houses: defining the airtight layer, defining relevant details, choosing materials, tendering and placing purchase orders, executing properly the works, checking of works.

Details are to be described so that they can be technically implemented; they are attached as annexes to the airtightness concept. Examples of details can be downloaded from FLiB-database. The database includes: a neutral schematic, a description of the required design and materials, a reference to possible shortcomings if performed improperly.

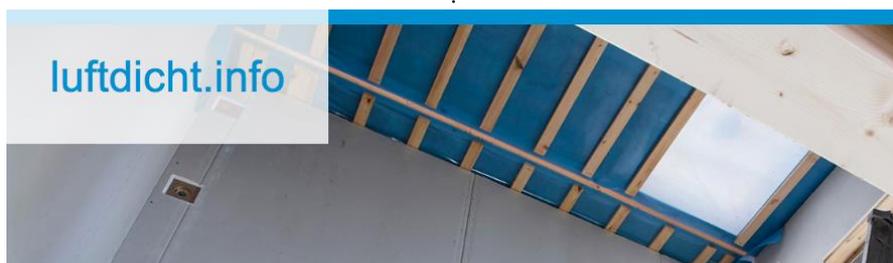
To ease the planning process, the examples of construction details are published in a databank

(<http://www.luftdicht.info/detaildatenbank.php>). The first release contains the most popular details: roof and wall construction, mounting external windows and doors and penetrations of the airtightness layer. A checklist is available to make the evaluation of the works easier

(http://www.fliib.de/ldk/FLiB_Luftdichttheitskonzept.pdf).

The tools developed complement German standard DIN 4108-7 Air tightness of buildings – Requirements, recommendations and examples for planning and performance. They are meant to support energy consultants, craftsmen and building owners establishing and implementing an airtightness concept in new built and refurbished single family houses. This is expected to help them meet the requirements of specific subsidies or funding schemes for new or refurbished low-energy houses in Germany.

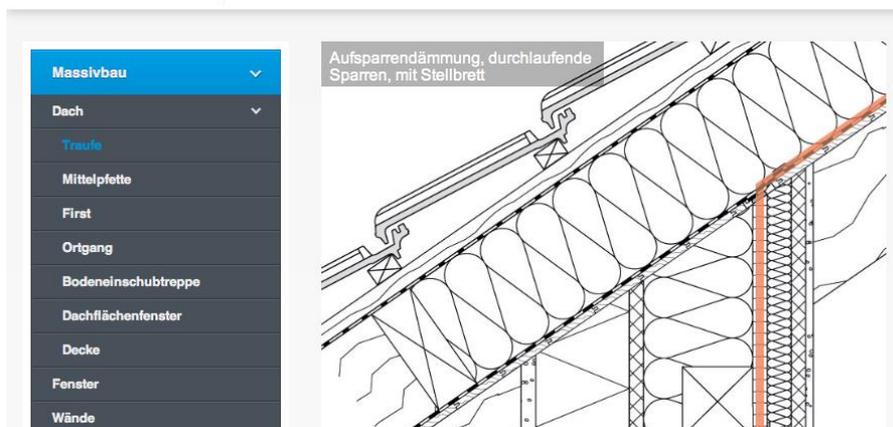
Read a longer article about this initiative [here](#), more information on www.luftdicht.info.



Luftdichtheitskonzept

Detaildatenbank

Infoblätter



AIVC launched new Technical Note on residential ventilation & health

The Air infiltration and Ventilation Centre recently released the new Technical Note: "TN68 Residential Ventilation and Health". This document summarises studies that prioritise pollutants in the indoor environment and presents a summary of pollutants driving the health risks indoors and their sources. It also describes methods to reduce exposures of contaminants using different control strategies with a special emphasis on the role of ventilation. TN68 is freely available for registered users to AIVC AIRBASE service. Click here to download the publication: <http://www.aivc.org/resource/tn-68-residential-ventilation-and-health>. Conditions for on-line access to AIVC publications are explained [here](#).

"Building airtightness and initiatives to improve the quality of the works" - Webinar recordings now available

The webinar: "Building airtightness and initiatives to improve the quality of the works" held on Tuesday 12 January, 2016 was organised by the QUALICHECK consortium (<http://qualicheck-platform.eu/>), in cooperation with TightVent Europe and the Air Infiltration and Ventilation Centre (www.aivc.org). The event aimed to give background information on selected initiatives to improve the quality of the works with respect to building airtightness. The [recordings](#) and the [slides](#) of the webinar are now available online at: <http://tightvent.eu/events/past-webinars>.



QUALICHECK 3rd webinar
Towards better quality and compliance
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Building airtightness and initiatives to improve the quality of the works

 Clarisse Mees BBRI (BE)	 Jelle Langmans KU Leuven (BE)	 Katherine Sauvet Saint Gobain - ISOVER (FR)	 Filip Van Mieghem Soudal (BE)
 Peter Wouters INIVE (BE)	 Maria Kapsalaki INIVE (BE)	 Alexander Deliyannis Sympraxis Team (GR)	<p>This webinar has been organised in collaboration with</p>  

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Events Calendar

- **September 12-14, 2016:** 37th AIVC –ASHRAE- IAQ joint conference "Defining Indoor Air Quality: Policy, Standards and Best Practices" in Alexandria, VA, USA.

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