



Air Infiltration and Ventilation Centre

# Newsletter

## Welcome to the new AIVC

Created in 1979, the Air Infiltration and Ventilation Centre now operates with a very new approach that was approved at the end of 2010. One key ambition of the new AIVC is to foster and/or coordinate projects resulting in different information tools (webinars, workshops, position papers, technical papers, ...) with an in depth review process and an increased impact of the dissemination of the information. 5 projects (shortly described in this newsletter) have already started with the approval the AIVC board (which replaces the previous AIVC Steering Group and is in charge of the overall policy and of approval of the projects and of their key deliverables).

We hope you enjoy our Newsletter to be informed on the progress of these projects as well as to learn about initiatives (publications, events, etc.) of interest to ventilation and infiltration specialists. Feel free to visit our website, which is a mine full of valuable information.

Peter Wouters, *Operating Agent AIVC*



## HealthVent, Health-Based Ventilation Guidelines for Europe

- Pawel Wargocki, *Technical University of Denmark*

Every European citizen has right to indoor air quality (IAQ) that does not endanger the health. This is implicit in the basic right to grow up and live in healthy environments. Recent EnVie project estimated in 2008 that the annual burden of disease (BoD) related to inadequate IAQ is 2 million disability adjusted life years (DALY) in EU27. Reducing this BoD is a high priority in the European health policies.

Ventilation is one of the methods to control IAQ including thermal conditions and humidity, structural moisture and mould growth, extraction and dilution of emissions from indoor sources and infiltration of ambient air pollution indoors. Ensuring optimal ventilation across the Member States is a key to reduce this BoD, to improve productivity and quality of life, and to remove associated social disparities between population groups and among Member States. At the same time, it is the key to meet the objectives of European energy conservation policies for buildings (Energy Performance of Buildings Directive, EPBD).

In 2009, EU's Executive Agency for Health and Consumers (EAHC) granted the project on Health-Based Ventilation Guidelines for Europe (HealthVent) within the EU's Health Programme 2008-2012; the Project was launched in mid

2010 and will run until the end of 2012. The aim of the project is to develop health-based ventilation guidelines reconciling health and energy impacts.

There are 11 partners in the project including experts from medicine, engineering, indoor air sciences, exposure assessment, energy evaluation and ventilation practices. They collect, survey and critically review the information that is necessary to develop the health-based ventilation guidelines. The guidelines are intended to be built on the experience, findings and recommendations of the previous projects funded by EC, the ongoing development of the WHO IAQ Guidelines and all projects relevant to the topic. Scientific data necessary to develop guidelines include the data on the effects of ventilation practices, techniques and rates on indoor air exposures and health, the data on the current ventilation regulations and standards, systems, practices and their performance in Europe, and data on the relationship between the existing ventilation strategies and technologies on the energy use in buildings.

The project will not only develop the guidelines but it will also discuss their consequences for health, using such indicators as reduction of DALY, for future trends in built environments, as well as for energy use in buildings, by establishing information necessary to continuously maintain EPBD implementation.

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International Energy Agency  
Energy Conservation in  
Buildings and Community  
Systems Programme



The project will also evaluate the possibilities and methodology for integrating IAQ in energy audits.

The guidelines are hoped to provide information necessary for policy makers, as well as all stake holders in building design, construction, operation and performance. The guidelines are hoped to help standardizing bodies and Member States in revising the existing ventilation codes and practices in ways that will reconcile increasing energy efficiency requirements with improved quality of life for European citizens.

At the end of 2012 the results of the project are intended to be presented at the workshop in Brussels. For further information see [www.healthvent.eu](http://www.healthvent.eu).

## Airtightness Workshop “Achieving relevant and durable airtightness levels: status, options and progress needed”

Brussels, 28-29 March 2012



With the collaboration or support from:



The objective of this workshop is to bring key experts together to discuss three specific issues:

- The philosophy for setting airtightness requirements: recommendations and pros and cons of various approaches
- The durability of seals and bonds: what we know and where we need to go
- How to deal with airtightness in the construction process: lessons learnt and potential for quality management approaches.

More [information](#) and [registration](#).

## The AIVC-TightVent conference “Towards Optimal Airtightness Performance”

Brussels, 12-13 October 2011

AIVC conferences have been the major international events on air infiltration and ventilation for over 30 years. This year, AIVC has combined forces with the Building and Ductwork Airtightness Platform (TightVent Europe — [www.tightvent.eu](http://www.tightvent.eu)), recently launched with the support of several institutes and industries. Over 160 participants attended the conference.

Next year's conference will be held in Copenhagen, 10-11 October 2012. Visit [www.aivc.org](http://www.aivc.org) for programme and registration information soon available.

## Developing a Health Based US Ventilation Standard

- J.M. Logue, M.H. Sherman, B.C. Singer  
Lawrence Berkeley National Lab

The Lawrence Berkeley National Lab's (LBNL's) has established the Healthy Efficient Homes (HEH) research program with the overarching goal of establishing a scientific basis for health-based ventilation standards that advances the mutually important objectives of a health-protective and energy-efficient U.S. housing stock. To achieve this goal, LBNL has undertaken a broad suite of research activities to identify the hazards in the indoor environment, identify the potential impact of various pollutant mitigation strategies, and develop tools to determine what elements in a ventilation standard minimize health impacts in a cost efficient manner.

As a key early step LBNL sought to identify the pollutants or contaminants of highest priority, i.e. those that will drive ventilation requirements, and their sources. Results of this first stage of analyses revealed that, from the perspective of air pollutant exposures, acceptable residential indoor air quality cannot be robustly assured simply by



## Webinars

**Achieving better envelope airtightness in practice: Recent Norwegian training and dissemination schemes**

Wednesday 9 November 2011  
10:00-11:30 Brussels, Oslo  
Webinar recording soon available at [www.tightvent.eu/events/recordings](http://www.tightvent.eu/events/recordings)

**Encouraging professionals to achieve better airtightness Recent French initiatives.**

Check [www.tightvent.eu](http://www.tightvent.eu) for future announcement"

setting a minimum overall ventilation or outdoor air exchange rate. In residences, the main drivers of non-biological air pollutant risk, excluding radon and SHS, are pollutant entry from outdoors (PM2.5, NO2, ozone), emissions from unvented combustion and cooking (NO2, acrolein, and PM2.5), and emissions from materials and consumer products (formaldehyde, acrolein). While material emissions are a major concern, removing pollutants from combustion and cooking and minimizing the infiltration of outdoor pollutants is also vital.

The major options for pollutant removal in the indoor residential environment fall into three broad categories: source reduction, air cleaning, and ventilation (general and task ventilation). From a review of available data sources, we determined that there is currently not sufficient information to reliably predict the effects on a residence level of using “low emitting” products and materials in home construction. However, calculating the potential energy savings from source control could be a



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driving force for establishing and populating the necessary databases. We have conducted preliminary studies on the effectiveness of ventilation. Preliminary results suggest that emissions increase when gas phase concentrations are suppressed by ventilation; however the increase only partially detracts from the benefits of ventilation when air exchange rates are similar to the ASHRAE standard for central ventilation. Laboratory and field studies of range hood capture efficiency conducted by LBNL have indicated that capture efficiency varies widely (from less than 20% to nearly 100% ) as a function of hood type, configuration, and which burners are used.

Maximizing the available pollutant removal options can lead to providing acceptable or good IAQ for a fraction of the cost. We are currently in the process of developing a data-driven, physics-based model to assess energy and indoor air quality health impacts across the U.S. population for both new and retrofitted homes. The goal of the modeling framework is to develop a computationally efficient modeling platform to determine the IAQ and energy impact of changes in residences that lead to changes in incremental airflow (i.e. adding ventilation, tightening homes, using local exhaust). The existing housing stock is varied and the impact of ventilation standards on that housing stock will be similarly varied. Model inputs will be distributions of home characteristics to represent the varied existing and new housing stock. The modeling effort will capitalize on existing data sources and previous research at LBNL and elsewhere. This framework will allow us to determine the population wide impact of widespread implementation of various ventilation standards on health and energy demand.

For more information, visit [epb.lbl.gov](http://epb.lbl.gov)

## AIVC-TightVent projects on track

A key ambition of the new AIVC is to encourage projects with a high impact

in terms of dissemination. With approval of the description of their major steps and deliverables by the AIVC board, the following projects have started:

- Development and applications of air leakage databases
- Quality systems for airtightness requirements
- Philosophy for building airtightness requirements
- How tight and insulated ducts should be?
- Night ventilation for passive cooling

Within those projects, TightVent Europe together with the AIVC will play a key role in organizing or encouraging efforts in a consistent manner. We make use of our network of re-known specialists around the world and will put forward synergies between national initiatives.

### Air leakage databases

On the subject of air leakage databases, a group of experts from Canada, the Czech Republic, France, Germany, Greece, the UK and the USA had an Internet meeting in June 2011 to discuss collaboration opportunities. The group agreed on three major deliverables (a standardized format for the output files of fan pressurization tests, a position paper on the need for structured air leakage databases, an overview of existing air leakage databases) as well as on the organization of workshops at the 2011 and 2012 TightVent-AIVC conferences.

#### Interesting links:

[resdb.lbl.gov](http://resdb.lbl.gov), Data from over 100 000 homes in the "Residential diagnostics database"

[weatherization.ornl.gov](http://weatherization.ornl.gov),

Weatherization and Energy Program evaluation (USA)

### Quality systems for airtightness measurements

Rewarding or imposing good airtightness in a regulation directly calls into question the reliability and accuracy of the measurements that are performed in practice. In several countries (e.g., DE, FR, UK), specific qualification schemes have been developed to address this issue.

This project reviews available schemes in this area and underlines the benefits but also pitfalls of such approach.

### Airtightness requirements

Should there be specific airtightness requirements? If so, what level is to be required? Should there be a minimum level of air leakage? The objective of this project is to review critical aspects that have to be considered to tackle such questions.

A report is envisaged, which will be based on science and experience in the field. Main issues will be discussed in a topical session at the AIVC-TightVent conference.

### Ductwork airtightness and insulation

The amount of energy involved in air transport in ductwork, if such system exists, represents a very significant amount of the total energy use of a low-energy energy building. Therefore, with nearly zero-energy as target, it becomes more and more critical not to waste energy because of excessive ductwork leakage or heat transmission losses. This project looks at how this issue is tackled in various countries, including in renovation. The programme is still under development and will be fine-tuned after the AIVC-TightVent conference, which included a specific session on this topic.

### Ventilation for cooling

There are many research, demonstration and commercial activities related to the use of ventilation for cooling purposes. However, there is no structured communications between these activities and many scientific efforts are repeated without a real transfer of knowledge between them. This projects aims at sharing information on this subject, starting with a specific workshop at the AIVC-TightVent conference with re-known specialists on ground heat exchangers and heat island effect.

## For more information about AIVC-TightVent projects

Please contact us at [info@aivc.org](mailto:info@aivc.org)



## Collaboration with TightVent

Both for the foreseen projects and the events in relation to airtightness, AIVC is combining forces with TightVent Europe ([www.tightvent.eu](http://www.tightvent.eu)), which is a newly-launched platform that focuses on airtightness of buildings and ductwork. TightVent Europe's main goal is to raise awareness on these issues that experience a revived interest with the recent trend towards nearly zero-energy buildings and to bring objective elements forward to ease the market transformation. Given the converging interests of both bodies, the AIVC Board and the TightVent Europe Steering Committee agreed to collaborate for instance for:

- the organization of the next conferences which will be joint AIVC-TightVent events;
- the overall scientific approach of TightVent and the implication of AIVC experts for scientific review of publications;
- the joint organization of four of the projects mentioned above.

TightVent receives support from the following organisations: European Climate Foundation, Buildings Performance Institute Europe, EURIMA, Lindab, Soudal, Tremco illbruck and Wienerberger.

## Join the BUILD UP community on Energy efficient ventilation for healthy buildings



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. BUILD UP ([www.buildup.eu/](http://www.buildup.eu/)) is the official EU platform on energy efficiency in buildings, and INIVE is actively supporting this by facilitating a community on "Energy efficient ventilation for healthy buildings".

# AIVC List of board members

## Belgium

Arnold Janssens, *University of Ghent*  
Jean Lebrun, *University of Liege*

## Czech Republic

Miroslav Jicha, *Brno University of Technology*  
Karele Kabele, *Czech Technical University*

## France

François Durier, *CETIAT*  
Pierre Hérant, *ADEME*

## Germany

Hans Erhorn, *Fraunhofer Institute for Building Physics*  
Heike Erhorn-Kluttig, *Fraunhofer Institute for Building Physics*

## Greece

Mat Santamouris, *NKUA University of Athens*

## Italy

Lorenzo Pagliano, *Politecnico di Milano*

## Japan

Shigeki Nishizawa, *NILIM*  
Takao Sawachi, *Building Research Institute*

## Netherlands

Kees De Schipper, *VLA*  
Wouter Borsboom, *TNO*

## New Zealand

Manfred Plagmann, *BRANZ*

## Norway

Peter Schild, *SINTEF Byggeforsk*

## Korea

Jae-Weon Jeong, *Sejong University*  
Yun Gyu Lee, *Korea Institute of Construction Technology*

## Sweden

Carl-Eric Hagentoft, *Chalmers University of Technology*  
Paula Wahlgren, *Chalmers University of Technology*

## USA

Andrew Persily, *NIST*  
Max Sherman, *LBNL*

## Operating agent

INIVE EEIG, <http://www.inive.org>, [info@aivc.org](mailto:info@aivc.org)  
Peter Wouters, *operating agent*  
Rémi Carrié, *senior consultant*  
Samuel Caillou  
Stéphane Degauquier

## AIVC board guests

Morad Atif • José Maria Campos • Willem de Gids •  
Kirsten Engelund Thomsen • Maria Kolokotroni •  
Martin Liddament • Eduardo Maldonado •  
Bjarne Olesen • Paulo Santos • Hiroshi Yoshino

## Representatives of organisations

Francis Allard, *REHVA*, [www.rehva.eu](http://www.rehva.eu)  
Jan Hensen, *IBPSA*, [www.ibpsa.org](http://www.ibpsa.org)