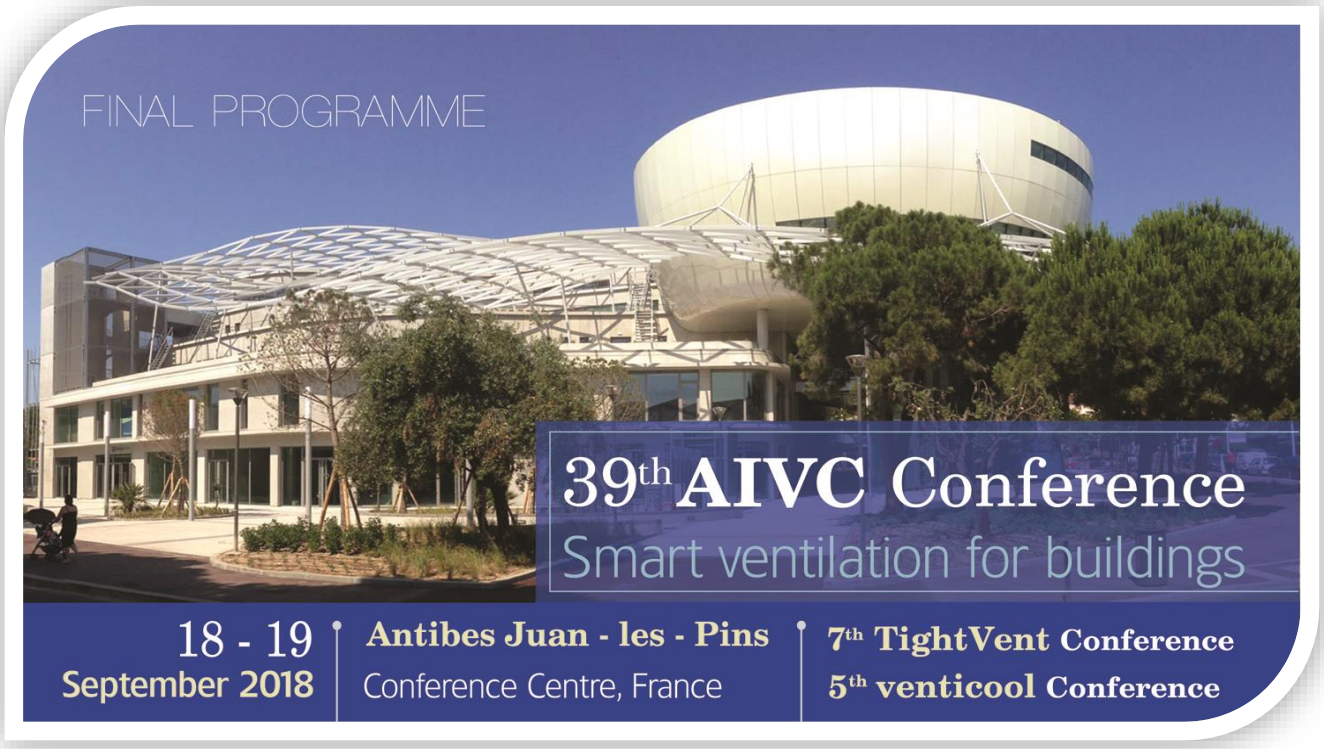

FINAL PROGRAMME

Tuesday 18 September 2018

ROOM A

09:00 -10:30 Opening - Plenary session

Chairpersons: ***Peter Wouters, François Durier***

Welcome on behalf of AIVC, venticool, TightVent

Peter Wouters, Manager, INIVE EEIG, Belgium

Welcome on behalf of CETIAT/ADEME

François Durier, CETIAT, France & Pierre Deroubaix, ADEME, France

Will the "smart" movement lead to an improved indoor environmental quality?

Bjarne Olesen (Invited speaker), ASHRAE President–DTU, Denmark

Advances in European residential ventilation systems in Nearly Zero Energy Buildings

Jarek Kurnitski (Invited speaker), REHVA Vice-president–Chair of the Technology and Research Committee, Estonia

EU support for innovation and market uptake in smart buildings

Philippe Moseley (Invited speaker), EASME, Belgium

French energy policies for buildings and HVAC

Emmanuel Acchiardi, (Invited speaker), MTES & MCT, France

Industry views with respect to smart ventilation as an enabler of indoor air quality

Yves Lambert (Invited speaker), EVIA, Brussels

10:30 -11:00 Coffee break

ROOM A

11:00- 12:30 Parallel Session 1A - Long & Short Oral Presentation
Session: Analysing airtightness measurements
Chairpersons: ***François Rémi Carrié, Paula Wahlgren***

Quality framework for airtightness testing in the Flemish Region of Belgium – feedback after three years of experience (Long Oral Presentation)
Maarten De Strycker, Belgium

French database of building airtightness, statistical analyses of about 215,000 measurements: impacts of buildings characteristics and seasonal variations (Long Oral Presentation)
Bassam Moujalled, France

Preliminary analysis results of Spanish residential air leakage database (Long Oral Presentation)
Irene Poza-Casado, Spain

Assessment of durability of airtightness by means of repeated testing of 4 passive houses (Long Oral Presentation)
Jiri Novak, Czech Republic

Onsite evaluation of building airtightness durability: Long- term and mid-term field measurement study of 61 French low energy single family dwellings (Long Oral Presentation)
Bassam Moujalled, France

In-situ and laboratory airtightness tests of structural insulated panels (SIPs) assemblies (Short Oral Presentation)
Vitor Cardoso, Portugal

ROOM B

11:00- 12:30 Parallel Session 1B – Topical Session: Commissioning of ventilation systems – Improving quality of installed ventilation systems
Chairpersons: ***Gaëlle Guyot, Laure Mouradian***

Several measurement campaigns in Europe highlighted that the quality of installed ventilation systems is often far from the performance expected at design stage (Boersta, 2012; Caillou, 2012:

Jobert, 2012). However, with the generalization of low energy buildings with air-tighter envelopes, ventilation performance becomes a crucial issue to avoid health problems and building damages. In this regard, several projects and initiatives have been conducted in France these past few years to improve the quality of installed ventilation systems, using the commissioning as a driver for change. Area of works proposed in this session are: the commissioning as a key point in the development of quality management schemes, the improvement of the reliability of ventilation performance assessment protocols, in-situ ventilation performance assessment methods for hybrid and natural ventilation, and change management towards a better quality of installed ventilation systems with active participation of stakeholders.

Development and test of quality management approach for ventilation and indoor air quality in single-family buildings
Sandrine Charrier (Invited speaker), France

Applications of the Promevent protocol for ventilation systems inspection in French regulation and certification programs
Adeline Bailly Mélois (Invited speaker) & Laure Mouradian, France

Presentation of a national consultative body on ventilation issues: actors, working groups and projects overview
Andrés Litvak & Romuald Jobert (Invited speakers), France

Assessing the performance of hybrid and natural ventilation systems: a review of existing methods (Short Oral Presentation)
Gabriel Remion, France

ROOM C

11:00- 12:30 Parallel Session 1C- Long & Short Oral Presentation Session: Indoor Air Quality & Ventilation in non-residential buildings
Chairpersons: ***William Bahnfleth, Pierre Deroubaix***

Thermal Comfort and indoor air quality in Drøbak Montessori School – A case study of Norway's first plus-energy school (Long Oral Presentation)
Tor Helge Dokka, Norway

Ventilation Performance of Natural Ventilation Building with Solar Chimney (Long Oral Presentation)
Haruna Yamasawa, Japan

Ventilation Performance of Natural Ventilation Building with Solar Void (Short Oral Presentation)
Haruna Yamasawa Japan

Ventilation Performance of Office Building with Natural Ventilation Shaft (Short Oral Presentation)
Toshihiko Sajima, Japan

Indoor air quality measurements in 35 schools of South-Western Europe (Short Oral Presentation)
Patrice Blondeau, France

Estimation and Analysis of Ventilation Rates in Schools in Indian Context (Short Oral Presentation)
Sandhiya Jayakumar, India

Inhalable particle concentration distribution of a typical university canteen in Shenzhen (Short Oral Presentation)
Jianhua Ding, China

A study of running set-points and user IEQ satisfaction perspectives in the Norwegian commercial building stock (Short Oral Presentation)
Niels Lassen, Norway

Indoor Environment in Sickroom with Ceiling Induction Diffusers and Measuring Method of Ventilation Effectiveness Using Tracer Gas (Short Oral Presentation)
Peihuan Liu, Japan

Development of a zonal model to assess indoor climate and damage risks to art works in church buildings (Short Oral Presentation)
Arnold Janssens, Belgium

Effects of meteorological factors on CO2 concentrations (Short Oral Presentation)
Maria Marrero, Spain

12:30- 13:30 Lunch Break

ROOM A

13:30- 15:00 Parallel Session 2A – Topical Session: Smart ventilation control strategies

Chairpersons: ***Max Sherman, François Durier***

Smart ventilation of buildings is a process to continually adjust the ventilation system in time, and optionally by location, to provide the desired IAQ benefits while minimizing energy consumption, utility bills and other non-IAQ costs (such as thermal discomfort or noise). The energy and IAQ performance of smart ventilation relies on a relevant control, based on information received from sensors and provided to actuators, operating with relevant and efficient control algorithms. The control strategy becomes therefore a key element of smart ventilation, building energy performance and IAQ. The objective of this session is to present and illustrate the definition of smart ventilation prepared by AIVC; show examples of the energy savings and IAQ performance of smart ventilation; discuss the various aspects of smart ventilation control strategies from the inputs of a panel of experts.

What is smart ventilation - presentation of the AIVC definition
François Durier, France

A review of smart ventilation energy and IAQ performance in residential buildings (Long Oral Presentation)
Gaelle Guyot, France

Smart ventilation control strategies - Panelists' point of view
Wouter Borsboom, Netherlands, Iain Walker, USA, Pawel Wargocki, Denmark

Discussion with the audience
Max Sherman (Moderator), USA

ROOM B

13:30- 15:00 Parallel Session 2B – Topical Session: Ductwork airtightness: Ongoing works in some European countries

Chairpersons: ***Valérie Leprince, Lars-Åke Mattsson***

On one hand, there is a number of studies that demonstrate significant energy use impacts of ductwork leakages, showing that the total energy use related to ventilation could be reduced by over 30 to 50 % by achieving an airtight ventilation system. On the other hand, a recent study has been performed among the TightVent Airtightness Association Committee (TAAC) to compare ductwork airtightness requirements in Europe. It has shown that ductwork airtightness does not seem to be

taken into account (neither in regulation nor in energy performance programmes) in most European countries. Conversely to building airtightness the awareness regarding ductwork airtightness has not grown in most Europeans Countries. Therefore, progress is still needed to better understand the impact of ductwork airtightness on energy use (fan, cooling and heating) and indoor air quality. The objective of this session is to present ongoing work in some European countries which have begun to define requirements either in regulation or in labels regarding ductwork airtightness.

Introduction: Why shall we care about ductwork airtightness?
Valérie Leprince, France

Duct leakage testing in Portugal, a consulting engineer's view and experience
Carlos Lisboa (Invited speaker), Portugal

Ductwork airtightness in UK: requirements and assessment of the installed performance
Marcus Lightfoot (Invited speaker), Netherlands

Statistical analysis of about 1,300 ductwork airtightness measurements in new French buildings: impacts of the type of ducts and ventilation systems (Long Oral Presentation)
Bassam Moujalled, France

Ventilation ductwork systems certification for a better air tightness (Long Oral Presentation)
Marie-Clemence Briffaud, France

The new air tightness class in ductwork - Aeroseal technology to seal leakages in new/retrofit ductwork and duct components - the foundation for highest energy efficiency in ventilation systems"
Jorg Mez (Invited speaker), Germany

ROOM C

13:30- 15:00 Parallel Session 2C - Long Oral Presentation Session: Ventilative Cooling

Chairpersons: ***Hilde Breesch, Peter Holzer***

Key findings of four years of research on Ventilative Cooling and how it is done
Philipp Stern, Austria

Status and recommendations for better implementation of ventilative cooling into Danish standards, building legislation and energy compliance tool
Christoffer Plesner, Denmark

Climate cooling potential of exposed thermal mass coupled with single sided ventilation in low energy buildings
Paul O' Sullivan, Ireland

Validation of Dynamic Model BSim to Predict the Performance of Ventilative Cooling in a Single Sided Ventilated Room
Michal Pomianowski, Denmark

Ventilative cooling in a school building: evaluation of the measured performances
Hilde Breesch, Belgium

Freevent: ventilative cooling and summer comfort in 9 buildings in France
Andrés Litvak, France

15:00- 15:15 Room change

ROOM A

15:15- 16:30 Parallel Session 3A – Topical Session: Demand controlled ventilation in French buildings – 35 years of wide scale experience
Chairpersons: ***Fabrice Lamarre, Laure Mouradian***

Demand controlled ventilation systems are representing a large majority of installations in France. They are commonly used for more than 35 years. The strong development of these systems can be explained by the French regulatory framework for air renewal. These demand controlled systems have been developed in order to optimise the energy consumption and at the same time to ensure indoor air quality and building durability. In residential buildings, demand control is based mainly on humidity whereas in commercial buildings it is based on occupancy and/or CO_2 levels. Research is still in progress to guarantee that the indoor air quality is ensured at design stage and maintained during the building life. The objectives of this session are to: show an overview of the available demand controlled ventilation systems installed in France in residential and commercial buildings; explain the assessment procedure, used to deliver technical agreements; share French experience of such systems, based on on-site measurements for assessing long-term durability in dwellings.

Introduction to demand controlled ventilation in France
Fabrice Lamarre & Laure Mouradian (France)

From Technical Appraisal of Demand-Controlled Ventilation Systems to Indoor Air Quality Assessment Using the Thermo-Hygro-Aeraulic code MATHIS
François Demouge (Invited Speaker), France

Feedback on installation, maintenance and aging of mechanical humidity-controlled exhaust units (Long Oral Presentation)
Stephane Berthin, France

Long-term durability of humidity-based demand-controlled ventilation: results of a 10 years monitoring in residential buildings (Long Oral Presentation)
Elsa Jardinier, France

Occupancy controlled ventilation in refurbished office building, combining presence and CO2 detection
Jean-Michel Navarro (Invited Speaker), France

ROOM B

15:15- 16:30 Parallel Session 3B-Topical Session: Integrating uncertainties due to wind and stack effect in declared airtightness results

Chairpersons: ***Valérie Leprince, Christophe Delmotte***

Building airtightness tests have become very common in several countries, either to comply with minimum requirements of regulations or programmes, or to justify input values in calculation methods. This raises increasing concerns for the reliability of those tests. There are four key sources of uncertainty in airtightness testing: measurement devices (accuracy and precision); calculation assumptions (e.g. reference pressure, regression analysis method); external conditions (wind and stack effect impact); and tester's behaviour. While competent tester schemes and independent checking procedures show potential to contain errors due to the tester's behaviour, there have been extensive yet sterile debates about how the building pressurisation test standard ISO 9972 should address other sources of uncertainties. As a result, no change has been made on these aspects on the new version of the standard which was published in September 2015.
With the present standard, the zero-flow pressure shall not exceed 5 Pa for the test to be valid. Consequently, in moderately windy conditions, it may be impossible to perform a pressurisation test in accordance with the standard, even using precautions with a careful uncertainty analysis.
This is the second topical session on this subject after the first one at AIVC 2017. The objective of this new session is to give a review of the work performed on this subject and to discuss recent work to quantify or contain the uncertainty.

Introduction: Output of the AIVC working group
Valérie Leprince, France

Wind speed in building airtightness test protocols: a review
Adeline Mélois (Invited Speaker), France

Experimental study of enclosure airtightness of an outdoor chamber using the pulse technique and blower door method under various leakage and wind conditions (Long Oral Presentation)
Xiaofeng Zheng, United Kingdom

Experimental Investigation of the Impact of Environmental Conditions on the Measurement of Building Infiltration, and its correlation with Airtightness (Long Oral Presentation)
Alan Vega Pasos, United Kingdom

Uncertainties in airtightness measurements: regression methods and pressure sequences (Long Oral Presentation)
Martin Prignon, Belgium

Numerical and experimental identification of factors influencing the pressure homogeneity during an airtightness test in a large building (Short Oral Presentation)
Loubna Qabbal, France

ROOM C

15:15- 16:30 Parallel Session 3C – Topical Session: Rationale behind ventilation requirements and regulations

Chairpersons: ***Wouter Borsboom, Willem de Gids***

Internationally there are many different requirements and regulations for ventilation. Sometimes the variation is more than a factor of five. There are strong drivers to reduce energy consumption for HVAC, and therefore the spread in requirements and regulation is worthwhile to study. To reduce ventilation flows there is a necessity to understand the reasons behind. Demand control to reduce this flows is in many countries growing but the control parameters are quite different, for instance humidity versus CO_2 control. If you don't know the reasons for ventilation, you cannot decide when and to what level you can reduce the ventilation flows. Latest studies on contaminants related to health are probably important for demand controlled ventilation. The objective of this session is to: show the differences in ventilation requirements; present the rationale behind the regulation given by the different countries; analyse the reasons for the differences in background and philosophies; present latest research in relation to most important contaminants; discuss the strategies on demand controlled ventilation

Ventilation requirements for different rooms as a result on the inquiries in 20 countries.
Willem de Gids, Netherlands

IAQ in working environments in Belgium: alternative approaches to CO2 requirement (Long Oral Presentation)
Samuel Caillou, Belgium

How should we characterize emissions, transport, and the resulting exposure to SVOCs in the indoor environment? (Long Oral Presentation)
John Little, USA

Diagnostic barriers to using PM2.5 concentrations as metrics of indoor air quality (Long Oral Presentation)
Benjamin Jones, United Kingdom

Rationale behind ventilation standards and regulations given by 20 countries
Wouter Borsboom, Netherlands

16:30- 17:00 Coffee break

ROOM A

17:00- 18:00 Parallel Session 4A - Long & Short Oral Presentation Session: Reducing noise and improving thermal comfort of ventilation
Chairpersons: ***Wouter Borsboom, Sonia García Ortega***

Noise Radiated by Circular Ventilation Ducts (Long Oral Presentation)
François Bessac, France

Improvement of the acoustical performance of mechanical ventilation systems in dwellings: a case study (Long Oral Presentation)
Samuel Caillou, Belgium

Influence of office layout and ceiling height on vertical temperature gradient in office rooms with displacement ventilation (Long Oral Presentation)
Natalia Lastovets, Finland

Ductwork design flaws and poor airtightness: a case study about a ventilation system reconditioning in an underground shelter (Short Oral Presentation)
Fabrice Richieri, France

Ductwork noise calculations: main outputs of AcouReVe project (Short Oral Presentation)
François Bessac, France

ROOM B

17:00- 18:00 Parallel Session 4B - Long & Short Oral Presentation Session: Modeling & energy performance of ventilation system
Chairpersons: ***Willem de Gids, Wendy Miller***

Including air-exchange performance in building regulation (Long Oral Presentation)
Harm Valk, Netherlands

Performance of a dual core energy recovery ventilation system for use in Arctic housing (Long Oral Presentation)
Boualem Ouazia, Canada

Experimental analysis of PCM heat exchanger in ventilated window system (Short Oral Presentation)
Yue Hu, Denmark

Development of Psychrometric diagram for the energy efficiency of Air Handling Units (Short Oral Presentation)
Kiyan Vadoudi, France

Cooling and Heating performance of Ceiling Radiant Textile Air Conditioning System with PAC (Short Oral Presentation)
Mari Kuranaga, Japan

Optimal control strategy of air-conditioning systems of buildings requiring strict humidity control (Short Oral Presentation)
Chaoqun Zhuang, Hong Kong

Validation of a Digital Twin with Measurement Data (Short Oral Presentation)
Johannes Brozovsky, Germany

CFD analysis of the optimal installation location of adsorption material in two ventilation conditions in residential buildings: natural convection and mechanical ventilation (Short Oral Presentation)
Haneul Choi, South Korea

ROOM C

17:00- 18:00 Parallel Session 4C- Short Oral Presentation Session: Control of indoor pollutants
Chairpersons: ***Andy Persily, William Bahnfleth***

Indoor particle concentration related to occupant behavior of Korean residential buildings
Hyungkeun Kim, South Korea

Ventilation improvement for make-up air supply system cooking-generated indoor particles
Kyungmo Kang, South Korea

The impact on indoor air of bio-based insulation materials: effect of humidity and potential mould growth
Ana Maria Tobon Monroy, France

The Assessment of Particulate Matter (PM2.5) Removal Efficiency on Air Cleaner Products through Full Scale Test in Korea
Kichul Kim, South Korea

Characteristics of ultrafine particle emission change depending on the placement of ventilation systems in 3D printer working environment
Sang-Chul Kim, South Korea

The assessment of surface condensation risk in dwellings. The influence of climate in Spain
Pilar Linares, Spain

A Stochastic Approach to Estimate Uncertainty in Pollutant Concentrations in an Archetypal Chilean House
Constanza Molina, United Kingdom

Thamesmead Condensation, Damp and Mould Strategy. The use of smart thermostats to assess ventilation interventions with demand controlled ventilation.
Peter Rickaby, United Kingdom

Accuracy Improvement for Estimating Indoor Carbon Dioxide Concentration Produced by Occupants
Masaki Tajima, Japan

Impact of construction stages on Indoor Air Quality
Charline Dematteo, France

Olfactory adaptation model based on change of odor threshold using impulse response function
Toshio Yamanaka, Japan

Intairieur: A label for the indoor air quality in new homes in France
Janice Orero, France

18:30- 20:30 Poster presentations – Industry stands – Cocktail reception

Wednesday, 19 September 2018

ROOM A

08:30– 10:00 Parallel Session 5A- Topical Session: Assessing performance of ventilation systems

Chairpersons: ***Max Sherman, Pawel Wargocki***

The old paradigm of a ventilation system providing constant airflow was relatively easy to assess. One could check a single flow rate, one could simulate energy impacts. Indoor air quality impacts were assumed. That paradigm is changing as we consider smarter ventilation systems, and multiple objectives for our ventilation system; performance means much more than simple airflow. The way we assess ventilation systems must evolve at the same time. This session has presentations look at different themes for assessing performance and looks at approaches used in a variety of countries. After the presentations there will be discussions about the approaches followed by some voting to see the opinion of the audience.

A review of performance-based approaches to residential smart ventilation (Long Oral Presentation)
Gaëlle Guyot, France

Rethinking Occupancy-based ventilation controls (Long Oral Presentation)
Ian Walker, United States

Demand controlled ventilation: relevance of humidity based detection systems for the control of ventilation in the spaces occupied by persons (Long Oral Presentation)
Sébastien Pecceu, Belgium

A review of the performance indicators of night-time ventilation (Short Oral Presentation)
Rui Guo, Denmark

Assessing the energy use and IAQ of various HVAC systems during the early design stage (Short Oral Presentation)
Marwan Abugabbara, Sweden

ROOM B

08:30– 10:00 Parallel Session 5B- Long & Short Oral Presentation Session: Demand controlled ventilation

Chairpersons: ***Arnold Janssens, Kari Thunshelle***

Measured and Simulated Energy Savings and Comfort Improvement of a Smart Residential Ventilation Control Strategy: Preliminary Results for North America and Europe (Long Oral Presentation)
Danny Parker, United States

Control of Distributed Cooling and Ventilation Systems in Hot and Humid Climates (Long Oral Presentation)
Markus Gwerder, Switzerland

Simulation of control strategies for ventilation systems in commercial buildings (Long Oral Presentation)
Bart Merema, Belgium

Smart monitoring of ventilation system performance with IEQ sensor networks (Long Oral Presentation)
Atze Boerstra, The Netherlands

Short-term mechanical ventilation of air-conditioned residential buildings: case study and general design framework (Short Oral Presentation)
Zhengtao Ai, Denmark

Hybrid ventilation systems enslaved by IAQ sensors (Short Oral Presentation)
Alexandre Lucet, France

Resilient demand control ventilation system for dwellings (Short Oral Presentation)
Xavier Faure, France

Numerical Assessment of the Influence of Heat Loads on the Performance of Temperature-Controlled Airflow in an Operating Room (Short Oral Presentation)
Cong Wang, Sweden

ROOM C

08:30– 10:00 Parallel Session 5C - Long & Short Oral Presentation Session: Improving the efficiency of ventilative cooling

Chairpersons: ***Manfred Plagmann, Pilar Linares Alemparte***

Ventilative cooling and improved indoor air quality through the application of engineered Earth Tube systems, in a Canadian climate (Long Oral Presentation)
Trevor Butler, Canada

Free cooling of low energy buildings with ground source heat pump system and bidirectional ventilation (Long Oral Presentation)
Svein Ruud, Sweden

Energy analysis for balanced ventilation units from field studies (Long Oral Presentation)
Bart Cremers, Netherlands

Study of ventilative Cooling potential to reduce air conditioning demand in Mediterranean schools (Short Oral Presentation)
Maite Gil-Baez, Spain

Characterising window opening behaviour of occupants using machine learning models (Short Oral Presentation)
Junseok Park, South Korea

Ventilative cooling effectiveness in office buildings: a parametrical simulation (Short Oral Presentation)
Mario Grosso, Italy

Experimental and numerical study of a building retrofitting solution combining phase change material panels and night ventilation (Short Oral Presentation)
Timea Bejat, France

Potential of mechanical ventilation for reducing overheating risks in retrofitted Danish apartment buildings from the period 1850-1890 – A simulation-based study (Short Oral Presentation)
Daria Zukowska, Denmark

10:00-10:30 Coffee break

ROOM A

10:30-11:30 Parallel Session 6A-Topical Session: Development of Indoor Air Quality Metric

Chairpersons: ***Pawel Wargocki, Max Sherman***

We all know IAQ is important, but traditionally the determination of it has been either through surrogates (like ventilation) and the use of engineering judgment. For most physical factors of concern, we prefer to have objective, quantifiable factors to optimize. A measurable and quantifiable factor is called a "metric" and developing a good one for IAQ is a key step forward in building physics. In this session we shall look at five different approaches at metrics for indoor air quality from ones that are relatively well know such as carbon dioxide concentrations, to others that are just being proposed.

Development of an Indoor Carbon Dioxide Metric (Long Oral Presentation)
Andrew Persily, USA

Economics of Indoor Air Quality (Long Oral Presentation)
Max Sherman, USA

A use case of data analysis for assessing Indoor Air Quality indicators (Short Oral Presentation)
Xavier Boulanger, France

Subjective Evaluation for Perceived Air Pollution Caused by Human Bioeffluents (Short Oral Presentation)
Lisa Yoshimoto, Japan

ROOM B

10:30-11:30 Parallel Session 6B- Topical Session: Performance of heat recovery ventilation systems in practice

Chairpersons: ***Arnold Janssens, Jelle Laverge***

In new houses in Europe the share of mechanical ventilation with heat recovery is increasing as a result of more severe energy performance requirements and of energy labelling for residential ventilation units. The presentations in this session provide information about the performance of heat recovery ventilation systems in practice, in terms of energy performance and indoor air quality.

Improving the usability and performance of heat recovery ventilation systems in practice (Long Oral Presentation)
Wouter Borsboom, Netherlands

Energy performance of demand controlled mechanical extract ventilation systems vs mechanical ventilation systems with heat recovery in operational conditions : Results of 12 months in situ-measurements at Kortrijk ECO-Life community (Long Oral Presentation)
Jelle Laverge, Belgium

Temperature, draft and ventilation efficiency of room based decentralised heat recovery ventilation systems (Long Oral Presentation)
Jelle Laverge, Belgium

ROOM C

10:30-11:30 Parallel Session 6C-Topical Session: Presentation and Discussion of the recently adopted IEA EBC Annex 80 on Resilient Cooling
Chairpersons: ***Peter Holzer, Hilde Breesch***

The inexorable increase in energy consumption for the cooling of buildings, and the increase in overheating of buildings has become one of the major topics for sustainable development in the building sector. To tackle these challenges a new Annex has been approved by the IEA EBC Executive Committee in June 2018 and which is currently in its Preparation Phase. The Annex 80 will assess and further develop Resilient Cooling for Residential and Small Commercial Buildings across all participating countries enabling multilateral transfer of knowledge. The Annex is open for the participation of scientific institutions as well industrial partners. The next preparation meeting will be held on 20th September 2018 in Juan-les-Pins at the Palais des Congrès.

11:30- 11:45 Room change

ROOM A

11:45- 12:45 Parallel Session 7A – Topical Session: Indoor Environmental Quality Global Alliance (IEQ-GA)
Chairpersons: ***Max Sherman, Donald Weekes***

The AIVC is one of the founding members of the new Indoor Environmental Quality Global Alliance (IEG-GA). The Alliance is expected to be an independent international NGO whose members are public or non-profit entities that are involved with advancing knowledge on common indoor

environmental quality issues. In its formative phases, the Alliance is being hosted by ASHRAE. The current Alliance president is Don Weekes. The current ASHRAE representative to the Alliance is Bill Bahnfleth and the current AIVC representative is Peter Wouters. These members of the Alliance Board will summarize the activities and aspirations of the Alliance and be available for an interactive discussion with the audience.

Indoor Environmental Quality – Global Alliance: History
William P. Bahnfleth, USA

Indoor Environmental Quality – Global Alliance & the AIVC
Peter Wouters, Belgium

Indoor Environmental Quality – Global Alliance: The Next Decade
Donald Weekes, Canada

ROOM B

11:45- 12:45 Parallel Session 7B – Topical Session: Supplementing Ventilation with Gas-phase Air Cleaning, Implementation and Energy Implications. The new IEA-EBC Annex 78

Chairpersons: ***Bjarne Olesen, Pawel Wargocki***

Ventilation accounts for approximately 20% of the global energy use for providing an acceptable indoor environment. The requirements for ventilation in the most standards and guidelines assume acceptable quality of (clean) outdoor air. In many locations in the world, the outdoor air quality is so bad that it is better to avoid supplying outdoor air to the buildings. In such cases, the alternative to use ventilation is to substitute supply of outdoor air with air cleaning so that the indoor air can be kept at high quality. Even when outdoor air is of a good quality, the use of air cleaning substituting ventilation air could reduce the rate of outdoor air supplied indoors and thereby energy for heating/cooling the ventilation air and for transporting the air (fan energy) can be saved. Since it is expected that air cleaning may in parallel improve the indoor air quality (perceived air quality and health) and reduce energy use for ventilation, it should be considered as a very interesting technology that can be used in the future. There is however a need for better evaluation of its potential to improve indoor air quality (and substitute ventilation rates) and the energy implication of using gas phase air cleaning. There is also a need to develop standard test methods of the performance of air cleaning devices.

Background and Objective of IEA-EBC Annex 78
Bjarne Olesen, Denmark

Measurements of perceived indoor air quality
Pawel Wargocki, Denmark

Discussion

ROOM C

11:45- 12:45 Parallel Session 7C – Topical Session: Measurement accuracy of air flow and pressure difference

Chairperson: ***Isabelle Caré***

The construction, function and maintenance of ventilation installations are of great importance for the perception of the interior climate of a building by those who work or live there and for its annual running costs. To check that the installation is functioning as intended, it is essential to use measurement methods, which are reliable and have known measurement uncertainties. Several project research have shown the issues related to the measurement of air flow at air terminal devices because of the induced disturbance of the flow pattern. Standards have been written in the past years, to describe measurement methods approved for on-site measurements. However, difficulties to reach the required measurement uncertainty still exist as the measuring instruments are probably not well characterized. The objective of this session is to: present and illustrate the issues related to flow measurement at air terminal devices; discuss the various aspects of air flow measurement from the inputs of experts.

Introduction – Presentation of the objectives of the session
Isabelle Care, France

A review of European standards related to measurement at air terminal devices
Carl Welinder (Invited Speaker), Sweden

Measurement issues of air flow at air terminal devices and perspectives
Samuel Caillou (Invited Speaker), Belgium

Discussion with the audience

12:45-13:30 Lunch Break

ROOM A

13:30-15:00 Parallel Session 8A - Topical Session: Sensors for smart ventilation

Chairpersons: ***Francois Durier, Iain Walker***

Smart ventilation of buildings means continual adjustment of ventilation rates in response to parameters such as: occupancy, outdoor conditions, electricity grid needs, indoor contaminants, operation of other systems. Smart ventilation can provide information to building owners, occupants, and managers on operational energy consumption and indoor air quality. Many smart ventilation strategies require sensors to measure air conditions inside (and sometimes outside) a dwelling. Recent developments in low-cost sensors have opened up the opportunity to sense indoor contaminants and use these measurements to control ventilation, filtration and air cleaning systems. Using low-cost computers together with low-cost sensors and implementing wireless sensor networks in buildings are also interesting perspectives to be investigated. The objective of this session is to: to show an overview of the available low cost sensors for indoor air measurements (particulates, VOCs, CO2) and results of their evaluation; assess their applicability to ventilation system control; show examples of the implementation of low-cost sensors in low cost computers or wireless sensor networks.

Use of low-IAQ sensors
Laure Mouradian (Invited Speaker), France

Are low-cost sensors good enough for IAQ controls? (Long Oral Presentation)
Ian Walker, USA

Indoor air quality investigation in a ventilated demonstrator building via a smart sensor (Long Oral Presentation)
Loubna Qabbal, France

A cost-effective and versatile sensor data platform for monitoring and analysis of building services (Long Oral Presentation)
Christian Hviid, Denmark

Discussion with the audience

ROOM B

13:30-15:00 Parallel Session 8B - Long & Short Oral Presentation Session: New methodologies and improvements for airtightness & air flow rates measurements

Chairpersons: ***Paula Wahlgren, François Rémi Carrié***

Individual unit and guard-zone air tightness tests of apartment buildings (Long Oral Presentation)
Angela Rohr, Germany

An extended pressure range comparison of the blower door and novel pulse methods for measuring the airtightness of two outdoor chambers with different levels of air tightness (Long Oral Presentation)
Christopher Wood, United Kingdom

Non-intrusive experimental assessment of air renovations in buildings and comparison to tracer gas measurements (Long Oral Presentation)
Maria Jose Jimenez Taboada, Spain

Airflow measurements at supply air terminal devices on residential balanced ventilation systems (Short Oral Presentation)
Valérie Leprince, France

The future of passive techniques for air change rate measurement (Short Oral Presentation)
Sarah Lima Paralovo, Belgium

Airtightness measurement of large buildings by using multi-zonal techniques: a case study (Short Oral Presentation)
Sylvain Berthault, France

A new method to measure building airtightness (Short Oral Presentation)
Timothy Lanooy, Netherlands

Comparison of experimental methodologies to estimate the air infiltration rate in a residential case study for calibration purposes (Short Oral Presentation)
Paolo Taddeo, Spain

Experimental study on the measurement of Building Infiltration and Air Leakage rates (at 4 and 50 Pa) by means of Tracer Gas methods, Blower Door and the novel Pulse technique in a Detached UK Home (Short Oral Presentation)
Alan Vega Pasos, United Kingdom

Measuring infiltration rates & leakage in residential buildings of Ahmedabad using blower door method (Short Oral Presentation)
Nikhilesh Singh Bist, India

ROOM C

13:30-15:00 Parallel Session 8C - Long & Short Oral Presentation Session: Evaluation of the effectiveness of the ventilation system
Chairpersons: ***Samuel Caillou, Pierre Deroubaix***

An experimental investigation into the ventilation effectiveness of diffuse ceiling ventilation (Long Oral Presentation)
Chen Zhang, Denmark

A holistic evaluation method for decentralized ventilation systems (Long Oral Presentation)
Sven Auerswald, Germany

Influence of multizone airleakage on IAQ performance in residential buildings (Long Oral Presentation)
Gaëlle Guyot, France

Residential balanced ventilation and its tested impacts on indoor pressure and air quality (Long Oral Presentation)
Boualem Ouazia, Canada

Case study : comparison between a central and a decentral ventilation unit in a school building from the 80's (Short Oral Presentation)
Paul De Schepper, Belgium

Isolation Rooms - CFD Simulations of Airborne Contamination Through Doors During Passage (Short Oral Presentation)
Trond Thorgeir Harsem, Norway

Investigation of contamination level in a cleanroom with weakened aerodynamic barrier (Short Oral Presentation)
Lasse Lind Knudsen, Denmark

Thermal comfort, IAQ and Energy use in Bedrooms (Short Oral Presentation)
Regina Bokel, Netherlands

15:00-15:15 Room change

ROOM A

15:15-16:15 Parallel Session 9A – Topical Session: Air Quality in Domestic Kitchens

Chairpersons: ***Benjamin Jones, Max Sherman***

Cooking has been identified as a key pollutant source in houses. Occupants are at risk of exposure to elevated pollutant concentrations emitted by cooking if they are not controlled. Ideally pollutants should be removed at their source before they are allowed to mix in the air. A common method of removal is the cooker/range hood whose performance, indicated by a capture efficiency, is not yet regulated by a standard or norm. Accordingly, this session will consider measurements of harmful pollutants made in kitchens, the effectiveness of mitigation measures, such as cooker/range hoods, and the ventilation rates and cooker/range hood capture efficiencies required to control pollutant concentrations. The objectives of this session are to: Consider measurements of pollutants made in domestic kitchens; evaluate cooker/range hoods and other methods of exposure mitigation; identify appropriate health-based regulations.

An intervention study of PM2.5 concentrations measured in domestic kitchens (Long Oral Presentation)
Catherine O'Leary, United Kingdom

Measured pollutant removal performance of island overhead kitchen exhaust (Long Oral Presentation)
Ian Walker, USA

Assessment of range hoods based on exposure (Long Oral Presentation)
Wouter Borsboom, Netherlands

Estimated distributions of PM2.5 concentrations in the kitchens of the English housing stock for infiltration and mechanical ventilation scenarios (Short Oral Presentation)
Catherine O'Leary, United Kingdom

ROOM B

15:15-16:15 Parallel Session 9B – Topical Session: BIM and Construction 4.0 opportunities in relation to ventilation and airtightness

Chairpersons: ***Philippe Moseley, Peter Wouters***

The market uptake of BIM (Building Information Modelling) is rapidly growing in nearly all countries and one can assume that this trend will continue and even accelerate in the coming years. In practice, there was until recently little to no attention for BIM in relation to ventilation related aspects. This session will give an overview of BIM activities at European level and 2 practical applications of BIM.

Overview of what the EU is doing in relation to BIM
Philippe Moseley (Invited Speaker), Belgium

BIM-integrated Design tool for in-line recommended ventilation rates with Demand Controlled Ventilation strategy (Long Oral Presentation)
Kari Thunshelle, Norway

Ventilation Planning for Mid-sized Japanese Commercial Kitchens and Calculation Method of Ventilation Rate Using Building Information Modeling (Short Oral Presentation)
Osamu Nagase, Japan

ROOM C

15:15-16:15 Parallel Session 9C – Topical Session: French initiatives for indoor air quality

Chairpersons: ***Corinne Mandin, John Little***

16:15-16:45 Coffee break

16:45-18:15 Closing session

Chairpersons: ***Andy Persily, Peter Wouters***

Best paper & poster award
Max Sherman, USA

Summing up of the "Ventilative cooling – Resilient cooling" track
Peter Holzer, Institute of Building Research & Innovation, Austria

Summing up of the "Smart ventilation, IAQ & Health" track
Benjamin Jones, University of Nottingham, United Kingdom

Summing up of the "Airtightness" track
Arnold Janssens, University of Ghent, Belgium

French R&D activities in relation to conference topics by ADEME
Nicolas Dore (Invited Speaker), ADEME, France

Modern History of Indoor Air Quality (1973-Present)
Donald Weekes (Invited Speaker), President, IEQ-GA, Canada

Announcement of 2019 conference
Arnold Janssens, University of Ghent, Belgium & Samuel Caillou, BBRI, Belgium

18:15 End of conference