

43rd AIVC

11th TightVent & 9th venticool Conference

Ventilation, IEQ and health
in sustainable buildings

October
4-5
2023

Aalborg
University
Copenhagen
Denmark

CONFERENCE ORGANIZERS

INIVE

AIVC

venticool
the platform for resilient restorative cooling

TightVent
Europe
BUILDING AND OUTDOOR AIR QUALITY PLATFORM



FINAL PROGRAMME



www.aivc2023conference.org

SUPPORTING ORGANIZERS



Tuesday 3 October 2023

19:00 - 20:00 Registration & Welcome Reception

Wednesday 4 October 2023

08:00 - 09:00 Registration

Room D

09:00 - 10:30 Opening - Plenary Session

Welcome on behalf of AIVC, venticool, TightVent

Arnold Janssens, INIVE/AIVC/Ghent University & Peter Wouters, OA, AIVC

Welcome on behalf of Aalborg University Copenhagen

Alireza Afshari, Aalborg University Copenhagen, Denmark

Tomorrow's Ventilation Solutions for Future Hospital Demands

Trond Thorgeir Harsem, Nordconsult, Norway

Users and practices in heating and ventilating homes - why do they behave different than we think?

Kirsten Gram-Hanssen, Aalborg University, Denmark

What we know about smart ventilation

Gaëlle Guyot, Cerema, France

Dallying with DALYs: Why acceptable IAQ should consider harm

Benjamin Jones, University of Nottingham, United Kingdom

10:30 - 11:00 Coffee break

11:00 - 12:30 Session 1A - Topical Session

(Airborne cross infection and engineering solutions)

Chairs: TBA

Opening

Alireza Afshari, Aalborg University, Denmark

Human exposure against airborne pathogens in an office environment

Risto Kosonen, Aalto University, Finland

Discussion on minimum ventilation rates for infection control

Yuguo Li, University of Hong Kong, Hong Kong

Mitigation of airborne transmission of respiratory viruses by ventilation - past, present and future

Arsen Krikor Melikov, Technical University of Denmark, Denmark

Point source ventilation effectiveness in infection risk-based post-COVID ventilation design

Jarek Kurnitski, Tallinn University of Technology, Estonia

Airborne transmission of disease in stratified and non-stratified flow

Peter V. Nielsen, Aalborg University, Denmark

Discussion with the audience

11:00 - 12:30 Session 1B - Long Oral Presentation Session

(Building airtightness testing & prediction)

Chairs: TBA

Acoustic method for measurement of airtightness - field testing on three different existing office buildings in Germany

Bjorn Schiricke, DLR (German Aerospace Center), Germany

Pulse tests in highly airtight Passivhaus standard buildings

Xiaofeng Zheng, University of Nottingham, United Kingdom

Correlation analysis between ACH50 and Air permeability considering the floor area of a residential buildings

Suji Choi, Inha University, Republic of Korea

Airtightness predictive model from measured data of residential buildings in Spain

Irene Poza Casado, Universidad de Valladolid, Spain

Bridging The Mechanical / Enclosure Gap
David de Sola, 3iVE LLC, United States of America

Room C

11:00 - 12:30 Session 1C - Topical Session

(Summer comfort and energy efficiency in hot periods: interest of mixed mode cooling and need of occupant feedback)

Chairs: TBA

Windows and ceiling fan occupant behaviour model coupling methodology with building energy models, a tropical case study

Maxime Boulinguez, Université La Réunion - PIMENT, France

An innovative approach to better understand hot discomfort, based on the measurement of global human responses, including physiological and sensory indicators - application to end users of mixed mode cooled buildings under tropical climate conditions

Gwénaëlle Haese, CSTB, France

An IAQ and thermal comfort coach prototype to improve comfort and energy consumption thanks to adequate management of natural ventilation: development and first feedback results

Arnaud Jay, CEA Liten - INES, France

Towards an alternative cooling: Optimisation of the successive use of the cooling systems from passive to active - Development of design and control strategies of the hybrid cooling

Arnaud Jay, CEA Liten - INES, France

12:30 - 13:30 Lunch Break

13:30 - 14:45 Session 2A - Topical Session
(Energy Performance of Gas Phase Air Cleaning)

Chairs: TBA

Introduction to IEA EBC Annex 78

Bjarne W. Olesen, Technical University of Denmark, Denmark

Air cleaner as an alternative to increased ventilation rates in buildings: a simulation study for an office

Alireza Afshari, Aalborg University Copenhagen, Denmark

Exploring the Energy-Saving Benefits of Gas-Phase Air Cleaning in Nordic Buildings

Sasan Sadrizadeh, KTH Royal Institute of Technology, Stockholm, Sweden

Gas phase air cleaning effects on ventilation energy use and indicators for energy performance

Dragos-loan Bogatu, Technical University of Denmark, Denmark

13:30 - 14:45 Session 2B - Topical Session

(Revision of ISO 9972: Improvements in the reliability of airtightness measurements)

Chairs: TBA

Introduction to the project of ISO 9972 revision

Valérie Leprince, Cerema, France

On the integration of envelope pressure inhomogeneity and autocorrelation in fan pressurization uncertainty analysis

Martin Prignon, Buildwise, Belgium

Statistical analysis of the correlations between buildings air permeability indicators

Bassam Moujalled, Cerema, France

Proposal for new implementations in ISO 9972

Benedikt Koelsch, Cerema, France

Discussion with the audience

13:30 - 14:45 Session 2C - Long & Short Oral Presentation Session
(Climate change & Resilient cooling)

Chairs: TBA

Which design parameters impact the resilience to overheating in a typical apartment building? (Long Oral Presentation)

Abantika Sengupta, KU Leuven, Belgium

Renewable ventilative cooling? Insights from an Irish perspective (Long Oral Presentation)

Adam O' Donovan, Munster Technological University, Ireland

Urban context and climate change impact on the thermal performance and ventilation of residential buildings: a case-study in Athens (Long Oral Presentation)

Maria Kolokotroni, Brunel University London, United Kingdom

Thermography-based assessment of mean radiant temperature and occupancy in healthcare facilities (Long Oral Presentation)

Paul Seiwert, RWTH Aachen University, Germany

Analyzing natural ventilation and cooling potential in a communal space building in Belgium under future climate conditions (Short Oral Presentation)

Shiva Khosravi, Archipelago Leuven, Belgium

A study of indoor environment and window use in French dwellings monitored during a summer with heatwaves (Short Oral Presentation)

Mathilde Hostein, Cerema and Entpe, France

Importance of thermal stack effect in ventilative cooling concepts for residential buildings (Short Oral Presentation)

Diederik Verscheure, Vero Duco NV, Belgium

14:45 - 15:00 Room Change

15:00-16:30 Session 3A - Topical Session

(Real performance of (smart) residential ventilation - performance assurance, fault detection, continuous commissioning)

Chairs: TBA

Welcome and introduction

Gaëlle Guyot, Cerema, France

Performance 2 project - Winter IAQ campaigns in 13 dwellings equipped with Humidity-based DCV systems: analyses of the ventilation performance after 15 years of use

Adeline Melois, Cerema, France

Checking and assuring real IAQ and energy performances through demand control and cloud connectivity

Ivan Pollet, Renson, Belgium

Data driven models for fault detection - Combining thermal and indoor air quality grey box models

Gabriel Rojas, University of Innsbruck, Austria

Evaluation of supply temperature set-points and airflow imbalance using smart ventilation data

Kevin Smith, Technical University of Denmark, Denmark

Technologies in balanced ventilation systems to maintain optimal performance in energy and comfort

Bart Cremers, Zehnder Group, The Netherlands

Discussion

15:00-16:30 Session 3B - Topical Session

(Building and ductwork airtightness regulations in various countries)

Chairs: TBA

Introduction: Presentation of the series of AIVC VIPs on building and ductwork airtightness regulations

Nolwenn Hurel, PLEIAQ, France

Building and ductwork airtightness in Norway: national trends and requirements

Tormod Aurlien, NMBU, Norway

Building and ductwork airtightness in the Netherlands: national trends and requirements

Niek-Jan Bink, ACIN Instrumenten, The Netherlands

Building and ductwork airtightness in Spain: national trends and requirements

Irene Poza Casado, University of Valladolid, Spain

Building and ductwork airtightness in Latvia: national trends and requirements

Andrejs Nitijevskis, IRBEST Ltd, Latvia

Air tightness and its impact on energy consumption in multi-family residential buildings in Montenegro (Short Oral Presentation)

Esad Tombarevic, University of Montenegro, Montenegro

Room C

15:00-16:30 Session 3C - Topical Session

(Resilient Cooling of Buildings meets Resilient Cooling in Cities)

Chairs: TBA

Resilient Cooling Technology Profiles from the EBC Annex 80

Peter Holzer, Institute of Building Research & Innovation, Austria

Resilient Cooling Guidelines from the EBC Annex 80

Vincenzo Corrado, Politecnico di Torino, Italy

Work in small Design Groups

Open discussion and collective conclusion in plenum

16:30-17:00 Coffee Break

17:00 - 18:15 Session 4A - Short Oral Presentation Session

(Indoor Air Quality & Health)

Chairs: TBA

Health risks of residential indoor and outdoor exposure to fine particle-bound phthalates

Jiayao Chen, University College Dublin, Ireland

HEPA filters to improve vehicle cabin air quality - advantages and limitations

Dixin Wei, Volvo Cars, Sweden

Experimental study of an innovative wet scrubber concept in regards to particle filtration and pressure loss

Nhat Nguyen, Rwth Aachen University, Germany

An evaluation of CO₂ emission rates by Chilean school children

Nicolas Carrasco, Pontificia Universidad Catolica de Chile, Chile

The Effects of Bedroom Mechanical Ventilation on Health and Sleep Quality

Hyeun Jun Moon, Dankook University, Republic of Korea

Analysis of PM_{2.5} indoor-outdoor ratio in lobby floor according to configurations of entrance (*Student Competition*)

Soyi Park, Inha University, Republic of Korea

Proposal of an effort-benefit diagram to compare unit and room air-change rates applied to a literature review

Sven Auerswald, Fraunhofer ISE, Germany

Experimental Investigation of Indoor Air Quality in an Open Office Environment

Mustafa Zeki Yilmazoglu, Untes Heating Air Conditioning Corp., Turkey

Hygienic Air Handling Unit Certification Program: the new necessity for a guaranteed indoor air quality

Ali Nour Eddine, Eurovent Certita Certification, France

Car traffic or emissions from heating sources: What is responsible for IAQ?

Katarzyna Ratajczak, Poznan University of Technology, Poland

Monitoring VOCs' concentrations in a circular biobased residential building using low-cost sensors (*Student Competition*)

Yannick Thienpont, KU Leuven, Belgium

Smart & Predictive Air Quality Solution

Paul Brassier, Prometech, Netherlands

Energy Implications of Increased Ventilation in Commercial Buildings to Mitigate Airborne Pathogen Transmission
David Artigas, Simpson Gumpertz & Heger Inc., United States of America

Room B

17:00 - 18:15 Session 4B - Short Oral Presentation Session

(Ventilation strategies & thermal comfort)

Chairs: TBA

Reflections on alternative modelling approaches regarding occupants' window operation behaviour

Christiane Berger, Aalborg University, Denmark

Development of air supplied ceiling radiant air conditioning system using the Coanda effect (*Student Competition*)

Satoshi Noguchi, The University of Kitakyusyu, Japan

Wind Tunnel Experiment of Wind-Induced Single-sided Ventilation under Generic Sheltered Urban Area

Zitao Jiang, Osaka University, Japan

A study on desiccant system regenerated by waste heat from home-use solid oxide fuel cell cogeneration system

Keita Mizuno, Misawa Homes Institute of Research and Development Co., Ltd., Japan

Method for Evaluating an Air-Conditioning System with Natural Ventilation by Coupled Analysis of a Building Energy Simulation Tool and Computational Fluid Dynamics (*Student Competition*)

Ryuichi Yasunaga, The University of Kitakyushu, Japan

Performance comparison of different ventilation strategies in elderly care homes in Belgium

Douaa Al Assaad, KU Leuven, Belgium

Sea Water Air Conditioning (SWAC): A Resilient and Sustainable Cooling Solution for hot and humid climates - Energy Performance and Numerical Modeling

Kanhan Sanjiv, University of French Polynesia, French Polynesia

The Effects of Lowering Temperature Setpoints on Perceived Thermal Comfort - An experimental study in office buildings (*Student Competition*)

Beatriz Coutinho, University of Coimbra - ADAI, Portugal

Long-term energy performance of dew-point indirect evaporative cooler under the climate change world scenario (*Student*

Competition)

Maria Jesus Romero-Lara, University of Cordoba, Spain

On the assessment of the pressure coefficient on the mixed ventilation modeling

Marcos Batistella Lopes, Associacao Paranaense de Cultura - APC - PUCPR, Brazil

Construction of operational control rules for an earth-to-air heat exchanger through transfer reinforcement learning (*Student Competition*)

Yuki Adachi, The University of Kitakyusyu, Japan

Ventilation and Thermal Performance Examination of Slot Line Diffuser for Perimeter Usage by CFD Simulation

Shaoyu Sheng, Osaka University, Japan

Optimization and metamodelization based on machine learning of a new neuro human thermal model

Mohamad El Kadri, Centre Scientifique Et Technique Du Batiment, France

Room A

18:15 - 19:00 Industry Presentations

Acin Instrumenten, BCCA, Blowerdoor, DooApp, Lindab, Mez-Technik, Renson, Retrotec, Soudal, Velux, WindowMaster

19:00 - 21:00 Poster presentations & Student Competition - Industry stands - Cocktail reception with snacks

Thursday 5 October 2023

Room A

09:00 - 10:30 Session 5A - Topical Session

(The Role of Building Ventilation on Building Decarbonization)

Chairs: TBA

Quantifying the Potential Health Impacts of Unvented Combustion in Homes - A Meta-Analysis

Nuria Casquero-Modrego, LBNL, United States of America

How to create a performance-based regulation on ventilation - the French Experience

Valérie Leprince, Cerema, France

Comparative Analysis Between Indoor Temperatures of Dwellings at Urban Scale During a Typical and Extreme Summers in a Temperate Climate

Ainhoa Arriazu-Ramos, Universidad de Navarra, Spain

Decarbonization and IAQ in Spain: a roadmap

Rafael Villar-Burke, CSIC, Spain

Discussion Time: The Role of Building Ventilation on Building Decarbonization

Room B

09:00 - 10:30 Session 5B - Long Oral/Topical Presentation Session

(Indoor Air Quality & ventilation)

Chairs: TBA

Ventilation behaviour of occupants driven by outdoor temperature: 12 case studies

Sonia Garcia-Ortega, IETCC-CSIC, Spain

Indoor air quality in Austrian classrooms - Assessing different ventilation strategies with a citizen science approach

Simon Beck, University of Innsbruck, Austria

Measurement of ventilation effectiveness and indoor air quality in toilets at mass gathering events

Ben Roberts, Loughborough University, United Kingdom

Impact of the building airtightness and natural driving forces on the operation of an exhaust ventilation system in social housing in Chile
Gilles Flamant, Pontificia Universidad Catolica de Chile, Chile

Metal Oxide Semiconductor sensors (MOS) for measuring Volatile Organic Compounds (VOC) - performance evaluation in residential settings

Jakub Kolarik, Technical University of Denmark, Denmark

Towards performance-based approaches for smart residential ventilation: a robust methodology for ranking the systems and decision-making

Baptiste Poirier, Cerema, France

Room C

09:00 - 10:30 Session 5C - Topical Session

(Importance of good resilient building design and standards to ensure good ventilative cooling performance to reduce overheating and environmental impact)

Chairs: TBA

Introduction

Christoffer Plesner, VELUX A/S, Denmark & Jannick Roth, WindowMaster International A/S, Denmark

Update on Resilient cooling and indicators from the IEA EBC Annex 80

Peter Holzer, Institute of Building Research & Innovation, Austria

Resilient Ventilative cooling in Design Practice: Where next?

Paul O'Sullivan, Munster University, Ireland

Life cycle assessment: A design element for ventilation system selection

Jannick Roth, WindowMaster International A/S, Denmark

Lessons Learned from Irish Schools: Early-stage Insights on Overheating

Paul O'Sullivan, Munster University, Ireland

Resilient cooling in office buildings: case study in Belgium

Hilde Breesch, KU Leuven, Belgium

Design procedures for ventilative cooling integrated in new standards

Christoffer Plesner, VELUX A/S, Denmark & Jannick Roth, WindowMaster International A/S, Denmark

Questions and open Discussion

10:30-11:00 Coffee break

Room A

11:00-12:30 Session 6A - Topical Session

(The role of carbon dioxide and particulate matter for assessing ventilation and respiratory disease transmission in buildings)

Chairs: TBA

Sensitivity Analysis of CO₂ Concentrations as Ventilation Metrics

Andrew Persily, NIST, United States of America

Evaluation of Uncertainties of Using CO₂ for Studying Ventilation Performance and Indoor Airborne Contaminant Transmissions

Liangzhu (Leon) Wang, Concordia University, Canada

Effects of ventilation on airborne transmission: particle measurements and performance evaluation

Huijuan Chen, Research Institute of Sweden (RISE), Sweden

Impact and benefits of the air cleaning measures implemented in two schools

Liang (Grace) Zhou, National Research Council Canada (NRC), Canada

Room B

11:00-12:30 Session 6B - Long Oral Presentation Session

(Indoor Environmental Quality)

Chairs: TBA

Critical reflections on indoor-environmental quality constructs

Ardeshir Mahdavi, TU Graz, Austria

Ventilation and sleep quality

Pawel Wargocki, Technical University of Denmark, Denmark

Applicability and sensitivity of the TAIL rating scheme using data from the French national school survey

Pawel Wargocki, Technical University of Denmark, Denmark

An investigation of MVHR system performance based on health and comfort criteria in bedrooms of low-carbon social housing in South-Wales, UK

Faisal Farooq, Cardiff University, United Kingdom

Impact of optimized residential ventilation with energy recovery on health and well-being

Martin Kremer, Rwth Aachen University, Germany

A detailed investigation of the impact of an innovative dynamic façade system on indoor environmental quality in offices
Magdalena Hajdukiewicz, Eindhoven University of Technology (TU/e),
Netherlands

Room C

11:00-12:30 Session 6C - Long Oral Presentation Session
(Ventilative cooling & Natural Ventilation)

Chairs: TBA

A methodology for evaluating the ventilative cooling potential in early-stage building design
Valentina Radice Fossati, Eurac Research, Italy

Ventilation reliability: A pilot study on window opening behaviour in a primary school (*Student Competition*)
Lara Tookey, Massey University, New Zealand

A survey of building design practitioner perceptions of ventilative cooling in their building design processes
Maha Sohail, Munster Technological University, Ireland

Can naturally ventilated office buildings cope with dusty outdoor air?
Evangelos Belias, EPFL, Switzerland

Distribution of Particulate Matter Concentration and Temperature Stratification Examined by Zonal Model and Experimental Measurements in Room with A Novel Portable Displacement Ventilation Cooling Unit
Toshio Yamanaka, Osaka University, Japan

Thermal comfort and risk of draught with natural ventilation - assessment methods, experiences and solutions
Jannick Roth, Windowmaster International A/S, Denmark

12:30 - 13:30 Lunch Break

Room A

13:30-14:30 Session 7A - Long Oral Presentation Session
(Air Cleaning)

Chairs: TBA

Evaluation of sensor-based air cleaners to remove PM2.5 and TVOC from indoors with pollutant sources of smoking and burning candles

(Student Competition)

Li Rong, Aarhus University, Denmark

Developing methodology for testing of gas-phase air cleaners based on perceived air quality

Pawel Wargocki, Technical University of Denmark, Denmark

Evaluating the impact of air cleaning on bioaerosols and other IAQ indicators in Belgian daycare facilities

Sarah Paralovo, VITO, Belgium

Removal of Odorants in Nursing Homes Using Air Cleaners

Stig Koust, Danish Technological Institute, Denmark

Room B

13:30-14:30 Session 7B - Long Oral Presentation Session

(Ventilation & infection risk)

Chairs: TBA

What can CO2 measurements tell us about ventilation and infection risk in classrooms?

Carolanne Vouriot, University of Cambridge, United Kingdom

Indoor air modelling and infection risk assessment in a naturally ventilated patient room

Natalia Lastovets, Tampere University, Finland

Performance of Local Ventilation System Combined with Underfloor Air Distribution as Preventative Measures for Infectious Diseases in Consulting Room *(Student Competition)*

Jun Yoshihara, Osaka University, Japan

The numerical investigation of human micro-climate with different human simulators

Haruna Yamasawa, Osaka University, Japan

Room C

13:30-14:30 Session 7C - Topical Session

(Personalized Environmental Control Systems (PECS) operation and evaluation)

Chairs: TBA

Introduction to IEA EBC Annex 87

Bjarne W. Olesen, Technical University of Denmark, Denmark

Indoor environmental quality (IEQ) and energy performance evaluation of PECS

Douaa Al-Assaad, KU Leuven, Belgium

Physiological sensing for thermal comfort assessment

Dragos-loan Bogatu, Technical University of Denmark, Denmark

14:30 - 14:45 Room Change

Room A

14:45-16:15 Session 8A - Topical Session

(Post Pandemic Pontifications)

Chairs: TBA

ASHRAE 241-2023 Control of Infectious Aerosols

Max Sherman, University of Nottingham, UK

Can the Wells-Riley model universally assess airborne pathogen infection risk?

Benjamin Jones, University of Nottingham, United Kingdom

Flow dynamic of human cough and measuring techniques: A review

Chen Zhang, Aalborg University, Denmark

Evaluating the impact of air cleaning and ventilation of airborne pathogens and human bio-effluents at two primary schools in Belgium

Klaas De Jonge, Ghent University, Belgium

Review of international standards describing air cleaner test methods

Hannelore Scheipers, Ghent University, Belgium

Rethinking different ventilation strategies in a post-pandemic era: a CFD assessment (Short Oral Presentation)

Alicia Murga Aquino, Kobe University, Japan

How the COVID Pandemic and the Energy Crisis Have Influenced Indoor Environmental Conditions in non-residential Buildings (Short Oral Presentation)

Aurora Monge, Universidad de Navarra, Spain

Room B

14:45-16:15 Session 8B - Long Oral Presentation Session

(Impact factors on IAQ)

Chairs: TBA

The impact of increased occupancy on particulate matter concentrations in mechanically-ventilated residential buildings in a subtropical climate

German Hernandez Herrera, University Polytechnic of Madrid, New Zealand

On-Site Capture Efficiency of Kitchen Range Hood Based on Particle Diameters and Exhaust Flow Rates

Shinhye Lee, Seoul National University, Republic of Korea

An investigation of cooking-related pollutants in the residential sector

Daniela Mortari, University Savoie Mont Blanc, France

Fine dust measurement in ducts of balanced ventilation systems

Bart Cremers, Zehnder Group Zwolle, Netherlands

The Impact of Deep Energy Renovations on Indoor Air Quality and Ventilation in Irish Dwellings

Hala Hassan, University of Galway, Ireland

Financial impact of leaky ductwork in buildings - a calculation tool to raise awareness

Nolwenn Hurel, PLEIAQ, France

16:15-16:45 Coffee Break

Room D

16:45-18:15 Closing session

Decoding 30 Years of Insights: Conclusions from ISIAQ's Landmark Webinar Series on Indoor Air Quality and Climate

Ying Xu, Tsinghua University, Beijing, China

Summing up of the "Smart ventilation, IAQ & Health" track

Benjamin Jones, University of Nottingham, United Kingdom

Summing up of the "Building and ductwork airtightness" track

Valerie Leprince, Cerema, France

Summing up of the "Ventilative and resilient cooling" track

Hilde Breesch, KU Leuven, Belgium

Best paper/poster award & Student Competition awards

Announcement of 2024 conference

Closing

19:00 Gala Dinner (ticket required)