



Newsletter

Air Infiltration and Ventilation Centre

Foreword



Welcome to the September 2021 edition of the AIVC newsletter aiming to inform you on the AIVC's latest activities.

This issue provides relevant links and information to upcoming events and newly released publications as well as updates on the outcomes of the on-going AIVC COVID-19 project. In addition, the newsletter features an article on Personal Environmental Control Systems (PECS) and its importance for working places.

We wish you a pleasant reading and look forward to seeing you in our future events. We would also like to encourage you to visit our [website](#), follow us on [twitter](#) and [LinkedIn](#) and subscribe to our monthly newspaper "Energy Efficiency and Indoor Climate in Buildings".

Peter Wouters, Operating Agent AIVC



no 20

September 2021

4 -6 May 2022 – 41st AIVC - ASHRAE IAQ joint conference in Athens, Greece

[COVID-19 update] Because of COVID-19 uncertainty of conditions to hold a face-to-face conference in Athens in September 2021, ASHRAE and AIVC decided to postpone the conference and reschedule it for May 4-6, 2022. There will not be a new call for abstracts for the rescheduled conference dates.

The conference "IAQ 2020: Indoor Environmental Quality Performance Approaches Transitioning from IAQ to IEQ", organized by ASHRAE and AIVC, will be held in Athens, Greece. The conference will also be the 9th TightVent and 7th venticool conference.

Indoor Air Quality (IAQ) has been the core of ASHRAE'S IAQ series of conferences for the past 30 years. This conference will expand from Indoor Air Quality to Indoor Environmental Quality (IEQ). IEQ includes air quality, thermal comfort, acoustics, and illumination and their interactions. The particular focus of this conference is on performance approaches including the metrics, systems, sensors and norms necessary to implement them.

Conference topics

• Health and Well-being: Appropriate technical and operational definitions • Performance Metrics: For all aspects of IEQ • Interactions: Interactions between IEQ parameters • Occupant Behavior: How behavior impacts IEQ and how IEQ impacts behavior - psychological dimensions of IEQ • Smart Sensors and Big Data: Sensor properties, data management, cybersecurity, applications • Smart Controls: Equipment properties, commissioning, equivalence • Resilience and IEQ: Responding to climate change and disasters • Ventilation: Mechanical, passive, natural and hybrid systems • Air Tightness: Trends, methods and impacts • Thermal Comfort: Dynamic approaches, health impacts and trends • Policy and Standards: Trends, impacts, implications • Role of ventilation and building airtightness in epidemic preparedness • Filtration and disinfection options to control COVID19 • Face-covering impacts on indoor air quality • HVAC and IEQ in a post-COVID world

For more information, please visit:

<https://www.ashrae.org/conferences/topical-conferences/indoor-environmental-quality-performance-approaches>

or contact: hblauridson@ashrae.org

In this issue

Foreword

4 -6 May 2022 – 41st AIVC - ASHRAE IAQ joint conference in Athens, Greece

12 October 2021 – Upcoming Webinar "Smart materials for energy efficient IAQ management"

AIVC's latest publications

AIVC COVID-19 Working Group Outcomes

What is PECS (Personal Environmental Control Systems)?

42nd AIVC Conference, October 2022, Netherlands

ISIAQ/IEQ-GA podcasts

AIVC List of Board Members



Air Infiltration and Ventilation Centre

12 October 2021 – Upcoming Webinar "Smart materials for energy efficient IAQ management"

The Air Infiltration and Ventilation Centre and the IEA EBC Annex 86 "Energy Efficient Indoor Air Quality Management in Residential Buildings" (<https://annex86.iea-ebc.org/>) are organizing the webinar "Smart materials for energy efficient IAQ management" to be held on October 12th, 2021 at 14:00-15:45 CET. The webinar will address the opportunities to use novel materials (from advanced functional nano-materials to bio-based building materials) as building components to actively/passively manage the IAQ, for example, through active paint, wallboards, and textiles coated with advanced sorbents or catalysts and quantify their potential based on the assessment framework developed in the annex.

Presentations & Speakers

- Introduction, Menghao Qin, Leader of ST3, IEA EBC Annex 86 – Technical University of Denmark (DTU), Denmark
- Metal-organic Frameworks for indoor environment control, Menghao Qin – DTU, Denmark
- Evaluating and Modeling of Indoor Passive Panel Technologies at National Research Council Canada, Doyun Won – NRC, Canada
- Electrospun fibers for Supply Air Filtration in residential buildings, Alireza Afshari – Aalborg University, Denmark
- Impact of VOC and moisture buffering capacities of bio-based building materials on IAQ and thermal comfort, Anh Dung TRAN LE – UPJV, France

For further information on registration etc. please visit: <https://www.aivc.org/event/12-october-2021-webinar-smart-materials-energy-efficient-iaq-management>

AIVC's latest publications

In April 2021 the AIVC released Ventilation Information Paper (VIP) #42, "The Concept for Substituting Ventilation by Gas Phase Air Cleaning". The paper discusses and evaluates the pros and cons by partly substituting required ventilation by gas phase air cleaning.

VIP #43: "Residential ventilation and health", released in July 2021, briefly presents the key outcomes of the [AIVC Technical Note 68](#) (TN 68) "Residential Ventilation and Health", in an effort to ease the dissemination of this key AIVC publication.

Access to the publications is free upon registration. Please use the links provided below to download the documents:

- VIP #42, "The Concept for Substituting Ventilation by Gas Phase Air Cleaning": <https://www.aivc.org/resource/vip-42-concept-substituting-ventilation-gas-phase-air-cleaning>
- VIP #43: "Residential ventilation and health": <https://www.aivc.org/resource/vip-43-residential-ventilation-and-health>

AIVC COVID-19 Working Group Outcomes

The AIVC board decided in their online meeting of September 2020 to start a project to collect, discuss and disseminate information about COVID-19 in relation to ventilation and airtightness. A working group (WG) was created to define the activities and outputs of the project with the title 'Ventilation, airtightness and COVID-19'.

One of the outcomes of the project is the development of a number of questions and answers by WG members to address issues in relation to COVID-19 and building ventilation in line with most recent scientific understanding. In November 2020, February 2021 & July 2021, the WG released 3 special issues of the AIVC newsletter presenting questions and answers provided by the WG (more elaborate answers are also available on the FAQ-section of the AIVC-website).

The AIVC WG also organizes a number of webinars in line with the project objectives. The webinar "COVID-19 Ventilation related guidance by ASHRAE and REHVA" was held on November 20th, 2020 with support from [ASHRAE](#) and [REHVA](#). 406 people from 42 countries attended the webinar. Another webinar digging deeper into the role of building ventilation on COVID-19 transmission entitled as "Building ventilation: How does it affect SARS-CoV-2 transmission?", was held on April 1st, 2021, with 438 participants from 47 countries.

We would like to encourage you to check the detailed outcomes of the project listed here:

Frequently Asked Questions (<https://www.aivc.org/resources/faqs>) developed by AIVC addressing issues in relation to COVID-19. The list that follows includes links to the most recently released set of questions:

- [What is the impact of a poor ductwork airtightness on the SARS-CoV-2 infection risk?](#)
- [What does SARS-CoV-2 teach us about building ventilation? Why should we care about it when there is a vaccine?](#)
- [What air change rate one can expect when a window is open in a room with doors closed?](#)
- [How to use the openable windows to provide sufficient ventilation to limit SARS-CoV-2 transmission in classrooms?](#)
- [Should I close my bathroom window due to SARS-COV-2?](#)
- [Is there good evidence that germicidal UV \(GUV\) could be beneficial for decontamination of infectious aerosols in occupied environments?](#)
- [Can we use ventilation with outdoor air during high pollution events outdoors?](#)

The **third special issue of the AIVC newsletter** released in July 2021 available at: <https://www.aivc.org/content/aivc-newsletter-special-issue-covid-19-july-2021>. [Previously released special issues can be found here: <https://www.aivc.org/resources/newsletters>]

The **slides and recordings of the latest webinar held** (see also: <https://www.aivc.org/event/20-november-2020-webinar-covid-19-ventilation-related-guidance-ashrae-and-rehva>):

- "Building ventilation: How does it affect SARS-CoV-2 transmission?" held in April 2021 available at: <https://www.aivc.org/event/1-april-2021-webinar-building-ventilation-how-does-it-affect-sars-cov-2-transmission>

If you have specific questions related to COVID-19 and ventilation, please let us know by writing an email to info@aivc.org.



What is PECS (Personal Environmental Control Systems)?

Bjarne W. Olesen and Ongun Berk Kazanci, Intl. Centre for Indoor Environment and Energy, DTU

Today we heat, cool, and ventilate the whole room even if people are only occupying a small area. This often results in a waste of energy and uniform conditions in the whole space. We also know that people are very different regarding their preferences in relation to room temperature and air quality. Therefore, it makes sense to develop systems for heating, cooling, ventilation and lighting that are personal and can be controlled personally.

Personal Environmental Control System (PECS) with the functions of heating, cooling, ventilation, lighting and acoustic has advantages of controlling the localized environment at occupant's workstation or in their immediate surroundings by their preference instead of conditioning an entire room. This improves personal comfort, health and energy efficiency of the entire heating, ventilation and air-conditioning (HVAC) system substantially. Personalized ventilation will also protect against cross contaminations, which are critical in open-plan offices and workplaces with close distance.

Figure 1 shows the concept of PECS [1].

There will in the future be an increasing interest and market for PECS as buildings will need to be pandemic proofed. The application is for workplaces with mainly sedentary activity such as offices (open-plan, banks, control centers, etc.). Due to the pandemic, where many people worked at home, there will be an increase in home working places where PECS may be a solution.

There is a need to establish design criteria and operation guidelines for PECS and to quantify the benefits regarding health, comfort, cost and energy performance. This includes also control concepts and guidelines for operating PECS in spaces with general ambient systems for heating, cooling, ventilation and lighting.

Research has been done with many types of PECS for local heating, cooling, ventilation,

air cleaning, lighting and acoustic. This includes desktop systems, which are mounted on desks or integrated in a furniture, or chairs with heating/cooling and ventilation. It also includes wearables, where heating/cooling and ventilation are included in garments or devices attached to occupants' body. Most of the research until today has been focused on thermal comfort and indoor air quality/ventilation: but there are also potential benefits for individual control of lighting and use of masking noise. Artificial lighting that simulates daylighting can have health benefits. Also, different light colours during the day will have benefits for wellbeing and productivity.

The majority of the studies confirm that the use of PECS can result in significant HVAC system energy use savings (even though the values of possible energy savings given in the literature vary in a large range).

However, several studies also point out that if PECS is not designed and operated correctly, there will be increased energy use instead of the intended energy savings.

Since most of the studies focused on the thermal comfort and air quality aspects of PECS, there has been little focus on the power use of the PECS itself [2].

There is very little information in literature on how the general HVAC and lighting systems shall be controlled together with PECS. The concept is that in spaces with PECS the requirement to the general environment can be relaxed, which together would result in energy savings.

There exist PECS products on the market today. Below a work desk with integrated fans and heating (Figure 3). The other example is a chair with integrated heating and cooling (Figure 2).

References

1. B. W. Olesen, A. K. Melikov and H. Grønbaek, "Performance criteria for a personalized indoor environment," in *Proceedings of Indoor Air 2011*, 2011.
2. R. Rawal, M. Schweiker, O. B. Kazanci, V. Vardhan, Q. Jin and L. Duanmu, "Personal comfort systems: A review on comfort, energy, and economics," *Energy and Buildings*, vol. 214, p. 109858, 2020.
3. W. Pasut, Z. H. E. Arens and Y. Zhai, "Energy-efficient comfort with a heated/cooled chair: Results from human subject tests," *Building and Environment*, vol. 84, pp. 10-21, 2015.
4. Ahrend, "Ahrend Comfort Workstation", <https://www.ahrend.com/nl/innovationlab/comfortwerkplek/>, 2021.



Figure 1: The concept of PECS [1]

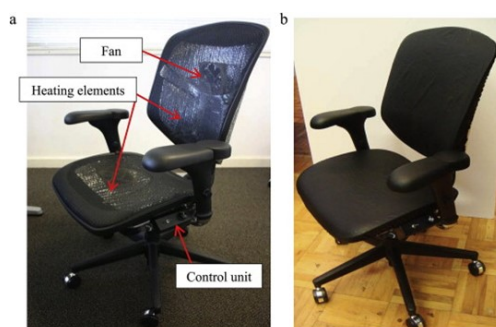


Figure 2: Heated/cooled chairs [3]



Figure 3: Ahrend Comfort Workstation [4]



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42nd AIVC Conference, October 2022, Netherlands

The preparations for the 42nd AIVC-10th TightVent- 8th venticool conference have started. It is the intention to have this conference in the Netherlands during the first half of October 2022. A professional conference organizer is involved in these preparations.

More information will follow soon so stay tuned!

If you are not yet registered for receiving AIVC information, please register here: <https://subscriptions.inive.org/user/register>

ISIAQ/IEQ-GA podcasts

The Indoor Environmental Quality Global Alliance IEQ-GA and ISIAQ (International Society of Indoor Air Quality and Climate) have partnered to create a unique video show and podcast - Indoor Environments- featuring important research that can enhance how we manage our built indoor spaces.

Indoor Environments is hosted by Bob Krell and Donald Weekes.

- Episode-1 focuses on the indoor environmental quality in schools, with guests Pawel Wargocki and Froukje van Dijken: <https://global.healthyindoors.com/c/indoor-environments/indoor-environments-episode-1-indoor-environment-quality-at-school-and-learning>
- Episode-2 focuses on how the quality of water may be adversely affecting our indoor environments, with guests David Krause: <https://global.healthyindoors.com/c/indoor-environments/indoor-environments-episode-2>
- Episode-3, with Charles Weschler and Glenn Morrison, looks at how occupants themselves affect our indoor environments: <https://global.healthyindoors.com/c/indoor-environments/episode-3>

More information can be found at: <https://global.healthyindoors.com/c/indoor-environments>

AIVC • List of board members

Australia: Mat Santamouris, University of New South Wales • Riccardo Paolini, University of New South Wales

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Jan Hensen, IBPSA, www.ibpsa.org

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