

Energy and Indoor Environmental Quality Performance of Personalised Environmental Control Systems

EBC ANNEX 87

Personalized environmental control systems (PECS) for heating, cooling, ventilation, lighting and acoustic allow control of the localised environment at occupants' workstations by their preference instead of conditioning an entire room to uniform conditions. This improves comfort, satisfaction, health of occupants, and the energy efficiency of the entire heating, ventilation and air-conditioning (HVAC) system substantially. Personalized ventilation can also protect against cross-contamination, which is critical in open-plan offices and workplaces where occupants are closely spaced. Market share and interest in PECS are likely to increase, as pandemic-proofing becomes a consideration in building design. Suitable applications of PECS are for workplaces with mainly sedentary activity such as offices, banks and control centres. Due to the COVID-19 pandemic, where many people have been working from home, there will

PROJECT OBJECTIVES

- 1** defining design criteria for personalized environmental control systems
- 2** developing operation guidelines for personalized environmental control systems
- 3** establishing control concepts and guidelines for operating personalized environmental control systems in spaces with general ambient systems for heating, cooling, ventilation, and lighting
- 4** quantifying the benefits of personalized environmental control systems regarding health, comfort, energy, and costs



A generic example of a chair-based personalized heating, cooling, and ventilation system
 Source: EBC Annex 87

likely be an increase in home working places for which PECS may also be a solution.

EBC Annex 87 has recently begun, with the overall objective to establish design criteria and operation guidelines for PECS and to quantify the benefits of PECS regarding health, comfort, energy, and costs. This includes control concepts and guidelines for operating PECS in spaces with general ambient systems for heating, cooling, ventilation and lighting. The scope includes all types of PECS for controlling local heating, cooling, ventilation, air cleaning, lighting and acoustics. It includes desk-mounted systems and integration of furniture with heating / cooling and ventilation functions. It also includes wearables, where heating / cooling and ventilation are included in garments or devices attached to occupants' bodies.

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Co-operation and Development (OECD) in 1974, with the purpose of strengthening co-operation in the vital area of energy policy. As one element of this programme, member countries take part in various energy research, development and demonstration activities. The Energy in Buildings and Communities Programme has co-ordinated various research projects associated with energy prediction, monitoring and energy efficiency measures in both new and existing buildings. The results have provided much valuable information about the state of the art of building analysis and have led to further IEA co-ordinated research.

EBC VISION

By 2030, near-zero primary energy use and carbon dioxide emissions solutions have been adopted in new buildings and communities, and a wide range of reliable technical solutions have been made available for the existing building stock.

EBC MISSION

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.

The following project deliverables are planned:

- a state-of-the-art report on PECS;
- a guidebook on requirements for PECS;
- a guidebook on PECS design, operation and implementation in buildings (including integration of PECS with ambient conditioning systems);
- a report on test methods for performance evaluation of PECS;
- universal criteria about requirements, characteristics, and performance of PECS to be used in national and international standards.

Project duration

Ongoing (2021 - 2026)

Operating Agents

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Further information

www.iea-ebc.org