IEA EBC Annex 87 - Energy and Indoor Environmental Quality Performance of Personalised Environmental Control Systems

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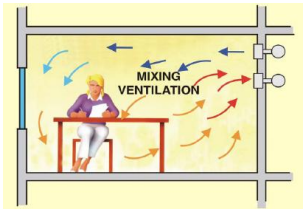
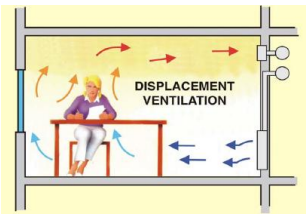
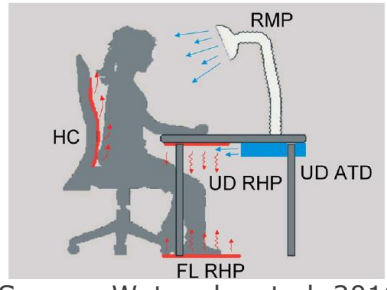




Source: Melikov 2010



Source: Watanabe et al. 2010

Source: Zhang et al. 2010

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Introduction

- IEA EBC Annex 87 - Energy and Indoor Environmental Quality Performance of Personalised Environmental Control Systems
- https://www.iea-ebc.org/projects/project?AnnexID=87
- https://annex87.iea-ebc.org/
- Initial idea in 2020
- Initial presentation to IEA EBC ExCo in June 2021
- Approved by IEA EBC ExCo in November 2021
- 1+3+1 = 5 year project
- 2.5 year left

Why PECS?

- Has several benefits compared to ambient (total volume) conditioning systems
  - Improved comfort, health and productivity
  - Higher satisfaction with the indoor environment, due to
    - Improvements in the immediate indoor environment experienced by the occupants
    - Possibility of personalized control
  - Potential energy savings
  - Increasing focus on individual differences between people → PECS can address these individual differences
  - Even more relevant due to COVID-19 (pandemic-proofing)

Why PECS?

- Not entirely new – significant amount of research exists
- Despite the proven benefits
  - No design guide or manual for such systems and their integration in building HVAC systems
  - Far from ”solved”, still several issues to be addressed
  - Not at the level of a common solution in buildings
  - Very limited ”real world” and commercial examples

Objectives and scope

- **The objective of the annex**
  - To establish design criteria and operation guidelines for PECS
  - To quantify the benefits regarding health, comfort and energy performance
  - Including control concepts and guidelines for operating PECS in spaces with general ambient systems for heating, cooling, ventilation, and lighting

Objectives and scope

- **The scope of the present annex** includes
  - All types of PECS for local heating, cooling, ventilation, air cleaning, lighting, and acoustics
  - Desktop systems, which are mounted on desks or integrated in a furniture, chairs with heating/cooling and ventilation and other types
  - Wearables, where heating, cooling, and ventilation are included in garments or devices attached to occupants' body

Main activities

- Subtask A: Fundamentals
- Subtask B: Applications and technologies
- Subtask C: Control, operation and system integration
- Subtask D: IEQ and Energy Performance evaluation
- Subtask E: Policy and marketing actions

Intended outputs

- Guidebook on requirements for PECS (Subtask A)
- State-of-the-art report on PECS (Subtask B)
- Guidebook on PECS design, operation and implementation in buildings (including integration of PECS with ambient conditioning systems) (Subtasks C & E)
- Report on test methods for performance evaluation of PECS (Subtask D)
- Universal criteria about requirements, characteristics, and performance of PECS to be used in national and international standards (Subtask E)

Table L.1 — Example criteria for personalized systems

•10:30 | Welcome & Introduction, *Bjarne W. Olesen (ICIEE/DTU, Denmark)*

•10:40 | Field experiences with PECS in The Netherlands, *Marije te Kulve (bba binnenmilieu, the Netherlands)*

•10:55 | Performance of Personalized Ventilation installed in Open-Plan Offices, *Arsen Krikor Melikov (DTU, Denmark)*

•11:10 | Questions and answers

•11:20 | The PECS journey in Singapore – From Field Environmental Chamber studies to Field studies, *Chandra Sekhar (NUS, Singapore)*

•11:35 | Utilization and Evaluation of PECS in a Research Facility Office in Japan, *Shin-Ichi Tanabe (Waseda University, Japan)*

•11:50 | Questions and answers

•12:00 | End of the webinar