

IEA EBC Annex 68 – Indoor Air Quality Design and Control in Low Energy Residential Buildings

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1 INTRODUCTION TO IEA EBC ANNEX 68

The overall objective of the IEA EBC Annex 68 is to provide scientific basis usable for optimal and practically applicable design and control strategies for high Indoor Air Quality (IAQ) in residential buildings. Naturally, those strategies should ensure minimal possible energy use. The project aims to gather existing and provide new data on pollution sources in buildings, model the indoor hydrothermal conditions and air quality as well as thermal systems, and will look to ways to optimize the provision of ventilation and air-conditioning.

The work of the Annex is organized into five subtasks:

- Subtask 1 will set up the metrics for required performances which combine the aspiration for very high energy performance with good indoor environmental quality.
- Subtask 2 is to gather existing knowledge or provide new data about indoor air pollutants as well as combined heat, air and moisture transfer.
- Subtask 3 will identify and/or further develop modelling tools that can assist designers and managers of buildings.
- Subtask 4 will build up on the fundamentals laid by previous subtasks and develop a guidebook on design and control strategies for energy efficient ventilation in residential buildings that will not compromise indoor air quality.
- Subtask 5 will identify and investigate relevant case studies and do field measurements where the above mentioned strategies can be examined and optimized.

The different subtasks are presented in more detail in extended abstracts for each of them.

2 KEY OBJECTIVES

The Annex has the following specific key objectives:

- To develop design and control strategies for energy efficient buildings that will not compromise the quality of the indoor environment. Operational parameters that will be dealt with will comprise, but not be limited to the means for ventilation and its control, thermal and moisture control and air purification strategies - and their optimal combination.
- To set up the metrics for required performances which combine the aspiration for very high energy performance with good indoor environmental quality.

- To identify or further develop the tools that will be needed to assist designers and managers of buildings in achieving the first key objective.
- To benefit from recent advances in sensor technology and controls, e.g. model based control principles, to identify methods to enhance indoor air quality while ensuring minimal energy consumption for operation.
- To gather existing or provide new data about indoor pollutants and properties pertaining to heat, air and moisture transfer that will be needed for the above analysis.
- To identify and investigate relevant case studies where the above mentioned performances can be examined and optimized.
- To disseminate about each of the above findings.

3 TARGET AUDIENCE

The project addresses the following primary stakeholders:

- Building designers (engineers and architects),
- Suppliers of HVAC and control systems
- Suppliers of materials used for building constructions and indoor furnishing,
- Providers of building management systems.

The project shall also address the interests of building owners, facility managers and users, as well as authorities that stipulate the building regulations and who administrate the rules. The perspective is that the project may indicate ways how future energy classes for buildings can be stipulated as being dependent on which pollution targets they can achieve.

4 ROLE OF VENTILATION IN IEA EBC ANNEX 68

The rationale of carrying out the proposed Annex is that buildings in the future will have to be optimized just to the limit in order to become as close as possible to being zero energy buildings. This means that the ventilation will also be reduced to just the absolutely necessary, while the quality of the indoor air must not be sacrificed. There is a need to adopt and demonstrate an integral view in the optimization that consider the sources, sink and transport of relevant pollutants that occur in buildings against the effect of ventilation.

The project is one of several past, recent and ongoing IEA EBBC Annex projects where ventilation plays a role. The AIVC (being the perpetual IEA EBC Annex 5) is one of them. Others are IEA EBC Annex 59, 60, 61, 62, 66, 67 and 69, and the EBC Executive Committee has facilitated a platform for coordination between them.

5 ANNEX DURATION AND PARTICIPATION

The project has commenced its preparation phase in 2015, which is planned to be followed by a three year working phase (2016-18). Commitments to participate shall be organized during the preparation year. While formal commitments are still in preparation for most participants, some 33 institutions from 16 countries have shown interest in the project (by June 2015).

The purpose of the Annex 68 Workshop at the 2015 AIVC Conference is to invite comments and possible project involvement or interaction with experts from the AIVC community and ventilation industry.