EBC

Energy in Buildings and Communities Programme

Factsheet

Ventilative Cooling

EBC ANNEX 62

The current trend in building energy efficiency towards nearly zero energy buildings creates a number of new challenges for building design and construction. One of the major challenges is the increased need for cooling in highly insulated and airtight buildings, which is not only required in summer and mid-season periods, but can also be needed in winter, particularly in office buildings.

Ventilative cooling is the application of ventilation air flow to reduce the cooling loads in buildings. It utilizes the cooling and thermal perception potential of outdoor air. Ventilative cooling can be an attractive and energy efficient solution to reduce the cooling load and avoid overheating of both new and renovated buildings. (Before ventilative cooling is considered, internal gains from equipment and solar radiation should be reduced to a reasonable level.)

Ventilation is already present in buildings through mechanical and / or natural systems. It can remove both excess heat gains, as well as increase air velocities and thereby widen the thermal comfort range. As cooling also becomes necessary outside the summer period, the possibilities of using the cooling potential of low temperature outdoor air increases considerably.

PROJECT OBJECTIVES

1. analyse, develop and evaluate suitable design methods and tools for prediction of cooling need, ventilative cooling performance and risk of overheating in buildings,
2. give guidelines for integration of ventilative cooling in energy performance calculation methods and regulations, including specification and verification of key performance indicators,
3. extend the boundaries of existing ventilation solutions and their control strategies and to develop recommendations for flexible and reliable ventilative cooling solutions that can create comfortable conditions under a wide range of climatic conditions, and
4. demonstrate the performance of ventilative cooling solutions through analysis and evaluation of well-documented case studies.

Both shading (to reduce solar gains) and ventilation should be applied to reduce cooling loads and avoid overheating.

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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.

To address the cooling challenges of buildings the project research focused on development of:

- design methods and compliance tools related to predicting, evaluating and eliminating the cooling need and the risk of overheating in buildings, and
- new attractive energy efficient ventilative cooling solutions.

ACHIEVEMENTS

The outcomes from this project are:

- overview and state-of-the art of ventilative cooling
- ventilative cooling source book
- ventilative cooling case studies
- guidelines for ventilative cooling design and operation
- recommendations for legislation and standards.

Project duration

Completed (2012–2018)

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Further information

www.iea-ebc.org

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