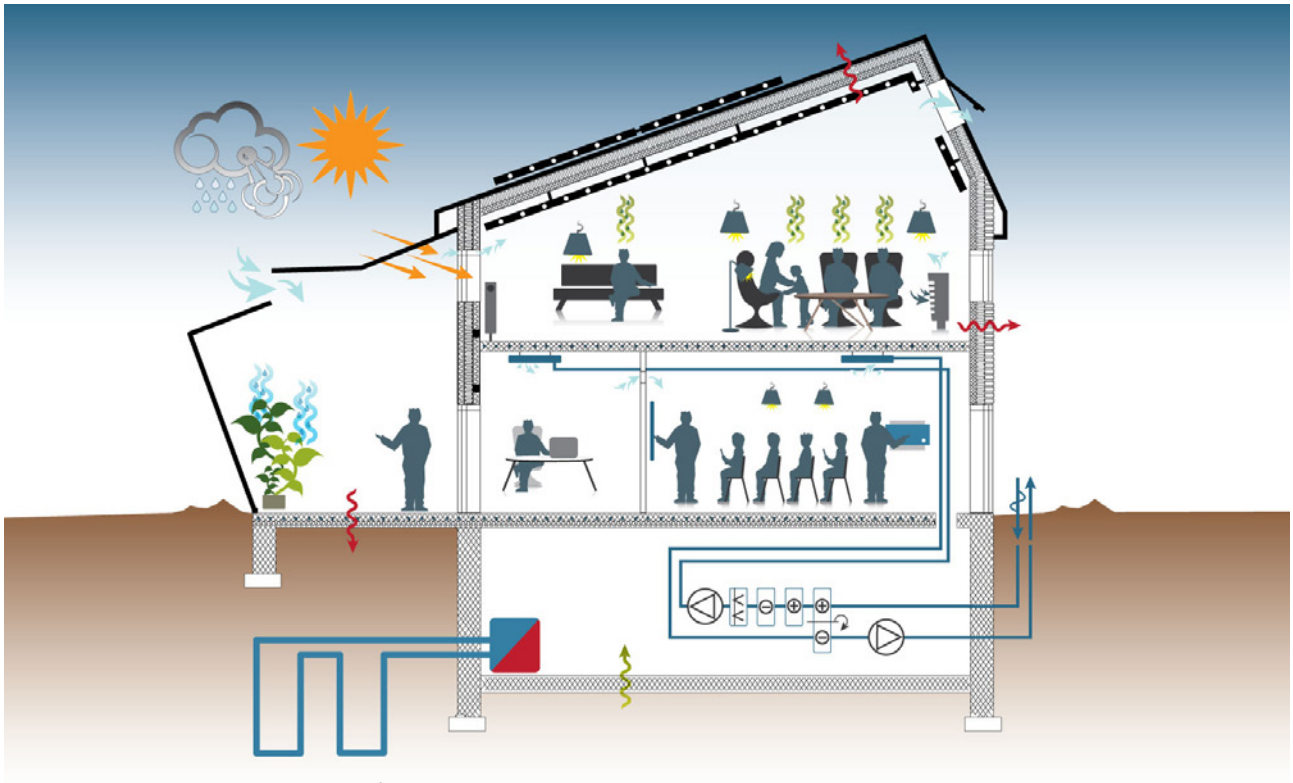
Why is it important to have a standard on Indoor Environmental Quality as part of the EPB standards?

BJARNE W. OLESEN
Ph.D. Fellow REHVA and ASHRAE,
Professor, International Centre for
Indoor Environment and Energy
Department of Civil Engineering
Technical University of Denmark
bwo@byg.dtu.dk

The Indoor Environment is mentioned several places in the 2010 EPBD recast (Table 1). To fulfil these requirements and to safeguard an acceptable and healthy indoor environment the standard EN16798-1 "Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics" has been developed. The first international standard that dealt with all indoor environmental parameters (thermal comfort, air quality, lighting and acoustic) was published in 2007 as EN 15251. This standard prescribed input parameters for design and assessment of energy performance of buildings and was a part of the set of standards developed to support the implementation of the Energy Performance of Buildings



Buildings are for people and building service systems and building envelope must provide an acceptable indoor environment.

Directive from 2003 in Europe. This standard has now been revised and will be issued for formal vote with a new number: FprEN 16789-1:2016. To support and give more detailed guidance for the use of the standard, a Technical Report, prCEN/TR16789-2 is also being developed. The standard is now written in normative language and all the informative text is included in the technical report. The standard includes default criteria given as 3 to 4 categories for the indoor environmental parameters. The values for the recommended default criteria are listed in tables in an informative annex B. Individual countries can decide if they want to use these default values, only use one category, or use quite different values, which then will be included in a national annex A with similar structure as annex B.

The standard includes both criteria for design and input values for energy calculations as required in the recast EPBD (Table 1, Annex 1–3). These criteria are established based on the preferences and expectations of the occupants and are basically independent of the building and systems used.

The EPBD refers several places to "cost-effectiveness". The standard for indoor environment does not address this directly. It is however important to be aware of the fact that in an office the energy costs for heating-cooling-ventilation is only 1 % of the salary costs. It is also well known that the indoor environment has a significant influence on people's productivity, so just 1% decrease of productivity will be equal to the total energy budget. This means any investment that will improve the indoor environment and increase productivity is cost effective. The technical report will include some information on this.

The recast also mentions the importance of "natural daylight" and "natural lighting" (Table 1, para 9, Annex 1–4). This is now also included in the standard, where minimum requirements and categories of daylight factors are included.

For energy calculations the result will also depend significantly on the assumed occupant schedules. It may then be very difficult to compare same type of building if different occupant schedules have been used in the calculations. Therefore, the standard list several recommended default occupant schedules for different type of spaces like residential, offices, schools, restaurants, meeting rooms, department stores, etc. The schedules include criteria for the indoor environment based on the default values, time and level of occupancy and internal loads from other equipment.

Although users or national regulators can choose different indoor environmental criteria as basis for the design or Energy Performance assessment, this standard will make it clear that when comparing different building constructions and building service systems on which input values for the indoor environment the comparison is based. ■

Excepts from the EPBD Recast (DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 May 2010) on the energy performance of buildings:

Para. (8) Measures to improve further the energy performance of buildings should take into account climatic and local conditions as well as indoor climate environment and cost-effectiveness…

Para. (9) The energy performance of buildings… That includes, in addition to thermal characteristics, other factors that play an increasingly important role such as …, indoor air-quality, adequate natural light and design of the building…

Para. (25) Recent years… Priority should be given… to application of passive cooling techniques, primarily those that improve indoor climatic conditions and the micro- climate around buildings.

Article 1. Subject matter. This Directive promotes the improvement of the energy performance of buildings within the Union, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.

Article 4. Setting of minimum energy performance requirements. These requirements shall take account of general indoor climate conditions, in order to avoid possible negative effects such as inadequate ventilation, as well as local conditions and the designated function and the age of the building.

Annex 1:

3. The methodology shall be laid down taking into consideration at least the following aspects: (h) indoor climatic conditions, including the designed indoor climate;

4. The positive influence of the following aspects shall, where relevant in the calculation, be taken into account: (d) natural lighting.