BUSINESS PLAN

CEN/TC 89
THERMAL PERFORMANCE OF BUILDINGS AND BUILDING COMPONENTS

EXECUTIVE SUMMARY

In order to reduce the use of primary resources and in order to reduce emissions originating from the use of primary resources, common tools need to be provided to the public. These tools are advisably provided in the form of standards.

Many of these standards define methods of test and analysis. Standardised methods allow appropriate comparisons and provide appropriate and necessary frames for fair product development and competition.

The building sector is a large energy end-user and also a large CO_2 polluter, but hardly no other sector has such great prospects in energy saving. In industrial countries space heating and cooling are the main “consumers” of energy (globally mainly fossil fuel is used). Cost-effective technologies exist that could considerably reduce the energy use in buildings in Europe. For a healthy indoor climate, the buildings must be well insulated, well ventilated and moisture safe. To meet these goals well established design methods are needed.

The overall aim for the work of CEN/TC 89 is to reduce our dependency of non-renewable resources and to reduce the emission of harmful substances to the air. This was also highlighted by the standardisation work undertaken in support of the EU Directive on Energy Performance of Buildings (EPBD).

Methods are needed for the evaluation of the energy performance of complete buildings and parts of buildings or building installations. In order to arrive at energy efficient buildings, materials and products that effectively contribute to the thermal performance of the building and its installations must be used. Standards dealing with the design and evaluation of materials, components and systems thus play an important role.

It is also important to use materials and products that effectively contribute to the thermal performance of equipment such as space heating appliances and freezers and of industrial plants. To enhance that goal, the methods referred to in product specifications and other trade documents shall as far as possible be standardized horizontal/general test and/or calculation methods.

The goal for the CEN/TC 89 work is to elaborate standards that contribute to the reduction of technical barriers to trade for products and services and serve as reference documents in national building regulations.

1 BUSINESS ENVIRONMENT OF CEN/TC 89

1.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of CEN/TC 89, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards.

It is emphasized by the European Commission that climate change is one of the most important challenges. In December 2008, EU adopted a comprehensive energy and climate package containing ambitious goals for the year 2020. With this the Commission hopes to get Europe on the right track – towards a sustainable future. This will be reached by:

- reducing the output of greenhouse gases with 20 % (30% if having an international agreement),
- reducing the use of energy by 20% through energy efficiency measures,
- 20% of the energy coming from renewable sources.

Many standards developed by CEN/TC 89 are useful as reference documents in national building regulations aiming at reducing greenhouse gases.

1.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of CEN/TC 89.

Hardly any other sector has such great prospects in energy saving as the building sector. In industrial countries space heating and cooling are the main “consumers” of energy (globally mainly fossil fuel is used). In the early years of the 21st century, the energy use in the built environment in the European Union (EU) accounted for approximately 40 % of the total energy use. This accounts for 36% of the European Union’s total CO_2 emissions.

The savings potential in the buildings sector is declared as the largest in the EU. In COM (2006) 545, the potential in the building sector is estimated to 27 % in residential buildings and 30% in commercial buildings. (As a comparison, the saving potential in the industry sector is estimated to 25% and in the transports sector to 26%).

A number of EU directives deal with energy and energy related issues. Among these, the following three seem able to influence the work of CEN/TC/89, with the first as the one with the largest foreseeable impact:

- Directive on *Energy Performance of Buildings (recast)*, 2010/31/EU.
- European Framework Directive on *Eco-Design of Energy-using Products*, 2005/32/EU.
- Directive on *Energy End-use and Energy Services*, 2006/32/EU.

Depending on the type of building and activities in the building, different measures can be taken to reduce the use of energy. In residential buildings, measures to reduce the use of energy is often performed on the building envelope, while corresponding measures in commercial buildings are often performed on the technical systems inside the building. A reduction of the use of energy will also reduce greenhouse gas emissions, since the reduction in use of energy will end up in a reduction in production of energy. It is during production all emissions occur, including greenhouse

gases.

In many cases, the reduction in use of energy is cost effective, meaning that over a period of time the total cost for energy will be reduced even when taking into account the initial costs for performing the measures.

All buildings are built for other purposes than to save energy. This is put forward by defining a number of demands the building and its indoor climate have to fulfil. To meet the demands on indoor climate, thermal performance as well as air quality demands must be met. Other demands to protect the building itself is for instance to make it moisture safe. To meet these goals well established design methods are needed.

2 BENEFITS EXPECTED FROM THE WORK OF CEN/TC 89

The overall aim for the CEN/TC 89 activities is to reduce our dependency of non -renewable resources and to reduce the emission of harmful substances to the air. For that, practical tools in the form of standards that can be used to design and construct or retrofit energy efficient buildings and installations, are needed.

In order to achieve this goal, CEN/TC 89 has produced and will produce sets of standards by which performance requirements can be expressed at various levels, from materials to complete buildings. These performance requirements may either be expressed in trade or building documents or in national building regulations. Earlier the focus has been on new buildings but considering the environmental effects of existing buildings, methods and procedures for the evaluation of the energy performance of existing buildings are developed nowadays.

In recent years considerable effort has been made in many countries to improve the energy efficiency of buildings. In some countries, the requirements in the building codes have been made more and more stringent several times over the last decades.

There is a trend to set limits for the total energy use of a building, based on one overall calculation procedure.

In addition to requirements on the total energy use of buildings, building regulations often give additional requirements on specific aspects, such as:

heat transfer through the building envelope; ventilation losses;
performance of space heating, hot water supply and drainage; performance of ventilation and air conditioning systems;
solar gains and loads; performance of lighting;
energy use for heating, cooling, hot water, lighting, etc.

The energy requirements may also deal with comfort aspects such as:

thermal comfort (internal temperature and humidity); indoor air quality;
visual comfort.

Methods are needed for the evaluation of the energy performance of existing buildings. These methods, by which complete buildings and parts of buildings or installations can be assessed, can also be used to follow up the results of energy efficiency measures. However, for existing buildings not only information about the energy performance is needed – the owner also needs advice on how to improve the building and its installations.

In order to arrive at energy efficient buildings, materials and products that effectively contribute to the thermal performance of the building and its installations must be used. For that standards dealing with the design and evaluation of materials, components and systems play an important role. In order to avoid barriers to trade, comparable specifications, as well as test and calculation methods, have to be used not only for one product applied under different climatic conditions but also for product families.

It is also important to use materials that effectively contribute to the thermal performance of equipment such as space heating appliances and freezers and of industrial plants.

The methods referred to in the above specifications shall as far as possible be horizontal/general test and/or calculation methods. CEN/TC 89 elaborates horizontal methods that could be applied regardless of the material(s). By calling up these methods in product specifications prepared by other CEN committees, thermal and moisture properties will be tested and reported in a harmonized way. This not only encourages fair competition on the market but also ensures that material properties or product information used as input for calculations are comparable and suited for that purpose.

In order to enable the market to develop or evaluate and choose materials, products and systems that will help reduce the use of energy in buildings and to arrive at well-performing technical solutions, the tools developed by CEN/TC 89 are needed. Another important aspect that should be taken into account is the market for technical consultants and persons carrying out energy audits or energy declarations, which further underlines the need for European standards in the area dealt with by CEN/TC 89.

Finally, as the reduction of energy use is indeed also a political matter, the exchange of comparable data within and between nations is of interest. Here, the use of standard methods play an important role, e.g. when collecting and comparing statistical data on energy use of buildings in different countries.

3 PARTICIPATION IN CEN/TC 89

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organization in your country.

At present, almost all CEN member bodies participate actively in the work of CEN/TC 89. CEN/TC 89 also cooperates with various organizations, many of which represent the European construction industry.

4 OBJECTIVES OF CEN/TC 89 AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of CEN/TC 89

The standards developed by CEN/TC 89 are horizontal standards. They do not specify requirements for products but support product specifications e.g. by giving standardized general calculation and test methods. A most important field for the TC 89 standards is the thermal design

of buildings in order to reduce the use of energy and to achieve a good indoor climate.

CEN/TC 89 has prepared/is preparing standards for the construction sector in the form of:
test and calculation methods related to heat transfer;
test and calculation methods related to moisture transfer; calculation of energy use in buildings;
on site methods for testing air tightness and thermal performance of buildings and building components;
input data for calculations, including material properties and climatic data; terminology related to the above mentioned topics.

The Vienna Agreement regulates the cooperation between CEN and ISO technical committees working in the same area, the aim being to avoid duplication of work. A large number of the standards are therefore being developed together with ISO/TC 163, *Thermal performance and energy use in the built environment*. The majority of the standards published by CEN/TC 89 are also global standards, either prepared under CEN/TC 89 lead or under ISO/TC 163 lead. (European standards prepared in cooperation with ISO are designated “EN ISO XXX”.)

4.2 Identified strategies to achieve the CEN/TC 89's defined objectives

Originally, priority was given to terminology and to heat and moisture test and calculation methods.

The need for a harmonised terminology was recognized already at the first meeting of CEN/TC 89 and it was agreed to adopt the terminology standards produced by ISO/TC 163. These terms and symbols agreed have since been used in the other standards produced by the committee.

CEN/TC 89 has published a number of test methods by which the thermal (energy) and hygrothermal performance of a wide range of materials, products and components or elements can be established. The test and calculation methods elaborated by CEN/TC 89 are material independent and are to be called upon when specifying thermal or hygrothermal properties of materials, products, or building components/elements. There are many good arguments for the use of general or horizontal standards. Correctly applied they give comparable properties which can be used when comparing materials and products in trade and design. This in turn leads to more and fair competition on the market and often cost effectiveness.

CEN/TC 89 is also working on standards covering in-situ methods by which complete buildings or building elements such as walls, roofs, etc. can be tested.

For complete buildings it is in most cases more realistic to calculate the energy performance and a series of standards to that purpose have been published. Some other calculation methods for building products and components/elements may be seen as alternatives to the more expensive testing, e.g. the calculation of the thermal transmittance of windows is an alternative to hot box testing.

As a complement to the calculation methods, standards for input data are being worked out, dealing with e.g. climatic data and tabulated hygrothermal properties for common building materials.

Energy performance levels for buildings are to a great extent governed by national authorities. However, CEN/TC 89 has prepared a standard on methods for expressing the thermal and energy performance of buildings and for energy certification of buildings. A correct evaluation of the energy status of a building is one of the most important factors for a total environmental

declaration of a building.

When designing healthy and sustainable buildings, the interaction between the building envelope, the installations, the activities in the building, etc. must be taken into account. In this connection it is important to define the system boundaries between the building, the various types of installations and the activities in the building as well as the energy supply systems. When dealing with standards related to the energy performance of a complete building, cooperation with other technical committees is essential.

To achieve a comprehensive and coherent standard package in conjunction with the *Energy Performance of Buildings Directive* (2010/31/EU), the work of the affected CEN/TCs (TC 89 *Thermal performance of buildings and building components*, TC 156 *Ventilation for buildings*, TC 169 *Light and lighting*, TC 228 *Heating systems in buildings* and TC 247 *Building automation, controls and building management*) is coordinated by CEN/TC 371 *Project Committee – Energy Performance of Building project group*.

CEN/TC 89 cooperates closely also with ISO/TC 163, *Thermal performance and energy use in the built environment*. Preferably, the same system of standards should be used in Europe and the rest of the world. Many of the calculation methods elaborated by CEN/TC 89 have been subject to parallel approval in ISO. CEN in turn has adopted a series of standards on terminology and also thermal test methods from ISO.

In accordance with the Vienna Agreement, revisions of the EN ISO standards are normally undertaken by ISO/TC 163 or its sub-committees.

4.3 Environmental aspects

The work of CEN/TC 89 *Thermal performance of buildings and building components* is focused on developing standards connected to the European building sector. From an environmental point of view, a substantial amount of the total greenhouse gas emissions in Europe is related to the energy use in the building sector. A substantial part of the energy used in buildings is obtained from fossil fuels. The use of all fossil fuels gives rise to greenhouse gas emissions.

The building sector is accounting for approximately 40% of the total energy end-use in Europe. Efforts to reduce the use of energy in the sector are crucial in order to achieve the goals of reducing greenhouse gas emissions. Standards developed for testing of products, for calculation methods, etc, i.e. the working area of CEN/TC 89, are essential for a sound and fair basis when European industry develops new and improves existing products and methods.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC 89 WORK PROGRAM

As described above, the work of CEN/TC 89 is to a great extent linked to the national building regulations or energy codes for new and existing buildings. A more active participation by government representatives, property owners, facility managers and consumer organizations is therefore desired. Hopefully, these key persons are represented on the national mirror committees but very few attend the meetings of CEN/TC 89. The same applies to designer and technical consultants.

We also see a need for a closer cooperation with the CEN product-TCs. CEN/TC 89 elaborates

general test methods to be called upon in product specifications. However, in many cases these general methods are duplicated by more specific methods standardised by the product-TCs. CEN (CCMC) should more strongly instruct the product-TCs to refer to horizontal methods. That would reduce the total work load and also improve the transparency for the consumers and other parties in the building sector.

The present standards or draft standards elaborated by CEN/TC 89 are based on the state of the art knowledge. However, during the work it is often discovered that a more refined method would be preferable or that the method needs to be tested in e.g. a round-robin exercise. Such investments are normally worthwhile but CEN/TC 89 very seldom has the resources for such studies.