



**BUSINESS PLAN**  
**CEN/TC 126**  
**“ACOUSTIC PROPERTIES OF BUILDING ELEMENTS AND OF BUILDINGS”**

**EXECUTIVE SUMMARY**

**Business Environment**

CEN/TC 126 as horizontal Technical committee aims at producing general standards to be applied to different elements and building constructions.

As a matter of consequence, stakeholders are manifold, including practitioners, scientists, authorities around Europe and professional bodies, government departments, architects, contractors, designers, construction companies and building materials producers, insulation manufacturers, laboratories.

European organisations in liaison with CEN/TC 126:

- CERAMIE-UNIE - the European Ceramic Industry Association
- SBS - Small Business Standards, Bruxelles
- EURIMA – European Insulation Manufacturers Association (Res 109-1999; Res 143-2002)
- GEPVP – Groupement Européen des Producteurs de Verre (Res 110-1999; Res 143-2002)
- EAACA – European Autoclaved Aerated Concrete Association (Res 143-2002)

The majority of building products may include an acoustic performance but only a few of them are dedicated only to acoustic. For example: suspended acoustic ceiling or resilient layer for floating floors are typical acoustic products.

**Benefits**

Improving the quality of life by reducing noise levels for people in working places and in residential buildings is the aim. The published standards provide information and guidance to determine:

- acoustic performance of building components and materials with measuring methods described in detail, to ensure reproducible and comparable results in all European laboratories with defined quality for:
  - Airborne sound insulation of building elements as e.g. walls, windows, floors, doors;
  - Improvement of airborne sound insulation by additional lining;
  - Impact sound insulation of floors and floor coverings;
  - Sound absorption of all kinds of building materials;
  - Noise emission from appliances and equipment used in water supply installation;
  - Noise emission of waste water and rain water installations;

And

- Acoustic performance of buildings with defined measuring methods for:
  - Airborne and impact sound insulation between rooms in buildings;
  - Airborne sound insulation of facades;
  - Sound level from service equipment in buildings;
  - Reverberation time in rooms;

And

- Sound insulation in buildings in the planning state by defined calculation methods based on the acoustic performance of the building elements;

And

- Single number quantities for results of measurements and calculations to describe the acoustic performance of building elements and buildings in a uniform way.

Further on guidance to construction product TCs for treatment of acoustics in product technical specifications, i.e to assist and advise product TCs on the drafting of all sections relevant to acoustical performance.

## **Priorities**

CEN/TC 126 has to provide the stakeholders with general laboratory test methods and single rating procedures so that the products may circulate within the internal European market according to the Construction Products Regulation n°305/2011 which include protection against noise as a basic requirement for construction works n°5.

Since 1987 (establishment of CEN/TC 126), more than 70 standards were adopted, and more than 20 new standards or revisions are in preparation at various stages of development.

Most of the published EN were prepared through the mutual cooperation between ISO/TC 43/SC 2 "Building acoustics" and CEN/TC 126 (Vienna agreement) in order to optimise the use of available resources and expertise for the benefit of stakeholders. Provisions covering the development and adoption of identical ISO and CEN standards, the drafting work being carried out in one organization.

## **Risk analysis**

In order to develop new test methods, WGs needs to perform the tests either in laboratory either in situ. The lack of funds for launching round robin tests in European countries slow down the process of drafting the ENs.

# **1 BUSINESS ENVIRONMENT OF CEN/TC 126 "ACOUSTIC PROPERTIES OF BUILDING ELEMENTS AND OF BUILDINGS"**

## **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 this CEN/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

### **1.1.1 General**

Building acoustics covers the following items:

- Acoustic design of building elements and building equipments and prediction and measurement of their performances;
- Acoustic design of buildings, and measurement and prediction of their performances.

It is intertwined with our lives in many ways. There is a positive aspect of sound, for example, in room or auditorium acoustics, but also a rather negative one in connection with traffic; equipment or occupational sound in dwellings can turn into noise.

Noise annoys and irritates man. Exposure to intense noise over long periods can lead to heavy psychological and physical impairment and damage. Standardization in the field of acoustics covers both the negative and positive aspects of sound, although most of the CEN standards are related to noise abatement purposes.

The major objectives of standardization in the field of Building acoustics are:

- to harmonize noise prediction and measurement methods in order to establish a good basis for noise limitations measures;
- to establish methods to determine the acoustical quality of building elements (emission of sound sources);
- to establish methods to determine the acoustical quality of rooms and buildings;
- to harmonize methods concerning the rating of building elements and building performances.

To summarize, the European standards produced by CEN/TC 126 involve the quality of life for all human beings. The work is deeply tied to the economies of all nations in the form of trade, jobs, manufacturing, national competitiveness and GDP. Its economic impact is impossible to measure but it involves governments, manufacturing sectors, consumers, labour forces and the public at large. All have a major stake in the standards produced in this technical area ranging from vocabulary and nomenclature to the basics of measurement, analysis, evaluation and prediction.

### **1.1.2 Specific areas**

The building acoustics market is generated by the following aspects:

- The protection of people in their domestic or work environment against noise from indoor and outdoor sources (most of the time driven by law);
- Consumer demand for an improved acoustic quality of rooms, offices, halls, auditorium (market driven).

Although European standards do not carry the weight of law, they profoundly influence the language, interpretation and direct extent of the law. Technical standards are often written into contracts to monitor acceptance and performance.

### **1.1.3 Stakeholders**

#### **a. Industry**

Manufacturers and users of building elements, acoustical materials, have a vital interest in the specification of harmonized and practice-oriented test and prediction methods and in other related guidance to meet regulatory requirements and consumer expectations when designing new products or new buildings and to achieve transparency in noise declarations and establishment of performance.

Also, manufacturers of sound measuring instruments and software have an interest in the application of their products. The framework of standardisation has been found ideal for manufacturers to communicate information on possibilities created by the latest technical developments in instrumentation and measurement techniques and to obtain information on likely developments in measurement requirements.

#### **b. Community**

It is estimated that in the EU, 20% of the European population suffer from noise levels in the environment that scientists and health experts consider to be unacceptable with respect to annoyance, sleep disturbance and adverse health effects. It is of general interest to the community to reduce noise and protect against noise in all its aspects, where people are in public and in private places in order to improve the quality of life. Acoustic standardization can provide guidance on all aspects of the measurement and reduction of noise and information on acoustic performance provided by products and buildings and, therefore, serves this global interest.

#### **c. Public authorities**

Public authorities deal with the development and application of legislation in the areas of buildings acoustic performance and equipment noise in rooms. A convenient way to separate technical discussions of measurement methods and political discussion of the setting of limits is to use standardized measurement and rating methods for the setting of limits. Standards can provide requirements and guidance on measurement, on assessment of risk, on acoustic performance and on low-noise design and planning.

**d. Test laboratories and consulting engineers**

There are an increasing number of requests for standardized methods of measurement and prediction of noise, including measurement uncertainties, for use by accredited test laboratories as well as by private consulting acoustical engineers, companies making their own noise measurements, etc. In addition, guidance documents are sometimes needed to assist the parties concerned in selecting the most appropriate measurement standard and/or suitable noise reduction measures.

**e. Research institutes**

Over the years, standardization has become an ideal framework for experts to work together on the development of measurement methods and other types of research, notably related to noise problems. In many cases it has been found that standards provide a most convenient way of collating and communicating results from research studies to the international community. Several cases of joint researches with University including PhD students have been initiated in W.G.'s

**f. Trade and consumer groups**

Standardized test and prediction methods and specifications provide a convenient way of regulating the communication between buyers and sellers.

**1.1.4 Regulatory and legal issues**

Political, economical, social, technical, legal and international factors that either directly require some or all of the standardisation activities proposed by the CEN/TC, or significantly influence the way these activities are carried out is the Construction Products Regulation. A number of the standards prepared by CEN/TC 126 in support of this Regulation help to remove technical barriers to trade and to improve social conditions.

**1.2 Quantitative Indicators of the Business Environment**

The quantitative indicators which describe the business environment in order to provide adequate information to support actions of the CEN /TC are rather difficult to extract since this committee does not prepare product standards, but fragmental figures for various parts of the work:

The products for noise control consist of two major parts:

- Products specifically dedicated to the design and control of the acoustic performance such as measurement equipment, software, consulting services
- Usual building products where acoustics is an added value: the buildings contains elements such as acoustic air inlets, window panes, windows, doors, resilient underlayers or floor coverings, acoustic ceilings, party walls. The "added" costs of the acoustic performance are quite difficult to separate from the product basic function, but the enormous number of systems will nevertheless generate very large figures.

For these reasons, exact detailed figures are impossible to achieve.

**2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC**

A great number of the standards prepared by CEN/TC 126 are basic standards directed to sector specific CEN construction product TCs enabling them to draft noise specifications referring to the basic standards.

Whenever the basic standards prove to be unsatisfactory regarding the uncertainty of laboratory measurements for a product or a family of products, CEN/TC 126 is developing dedicated test

codes together with manufacturers of building products. These test codes refer to basic standards, and specify in addition very stringent conditions of preparation, installation and test in order to avoid all possible factors of scatter in the results obtained in different laboratories. In addition, a technical report has been drafted and distributed among the CEN product TCs, to give them information on how to treat acoustics in product technical specifications.

The result is that almost all building products benefit from CEN/TC 126 production of basic standards, test codes or technical reports. This will result in a fair evaluation of products performances and an optimum and cost-effective selection of products according to their actual quality, and therefore a reduction of trade barriers. The work of CEN/TC 126 contributes strongly to an improvement of comfort and a reduction of annoyance in public, working and private environments.

### **3 PARTICIPATION IN THE CEN/TC**

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.

## **4 OBJECTIVES OF THE CEN/TC AND STRATEGIES FOR THEIR ACHIEVEMENT**

### **4.1 Defined objectives of the CEN/TC**

Based on the considerations above, the CEN/TC proposes the following objectives and strategic directions for its future work:

1. To develop acoustic measurements standards for testing the performance of building products, elements and buildings. To meet the needs of professionals, within the objective to be used in harmonized “products standards”, and the application of the construction products Regulation and CE marking. The cost of the test shall be consistent with the importance of the measured performance and the size of the market.

Most of basic standards, which deal with traditional performances of products, have been revised under the Vienna agreement procedure and are available for the stakeholders. An important effort was made to restructure the old series of standards EN (ISO)140, to make it more comprehensive, and to clearly separate the basic standards from their application to a family of products within a set of test codes (new series EN ISO 10140). An important standard concerning the precision of acoustic measurements (EN ISO 12999-1) has been published according to the Vienna agreement, under ISO lead, and is available to be used by European accredited laboratories. But way to introduce these data in test reports was to be clarified and has been launched as NWI.

An alternative to measurement standards requiring long and expensive setups (constructions) may be founded in hybrid methods. The mechanical parameters of the product components are measured and the acoustic performance is estimated according to a physical model, and then tuned with a limited set of measurement results. This procedure can be applied for example to floating slabs. The hybrid method can also be applied to systems or kits having a large number of components/elements each with different performances.

2. To improve the precision of basic measurement standards and to develop test codes for certain specific products categories so that the dispersion of the results obtained in various European laboratories on the same product is compatible with the needs of the large European market and a fair competition between the companies.

The improvement of the laboratory standards precision is basically limited by the fact that the design of the test rooms is very different from one laboratory to another one, and restrictions to the design are hardly possible since this would result in important and expensive modifications to a lot of existing laboratories. New measurements techniques shall be sought, to overcome this difficulty which arises often at low frequencies.

Another possible origin of a poor reproducibility of results is the differences of selection of the test object, the curing and mounting conditions in the test rooms. The decision to develop more detailed test codes dedicated to a family of products, which is currently in progress for two building products, must be extended to all products for which the measurement procedure is considered unsatisfactory for a fair trade market.

3. To develop standards characterizing new acoustic properties of building or building elements, with an objective of decreasing the annoyance due to noise and improving user's comfort, which support the innovation and the development of new markets

Performances, other than traditional ones, and related to comfort or annoyance in using buildings and building products must be characterised, in order to differentiate their quality and offer an objective figure to communicate towards the end users. The rainfall noise and the walking noise on floors are good example, where the market of innovative products is linked to a representative and selective characterisation of their performances in use.

The development of a new type of energy saving products shall be attentive not to jeopardize the acoustic performances, and adapted standards to this question may be considered.

4. To homogenize the practices of engineering and design departments, consulting engineers and to provide them with reliable tools of prediction, whose precision is compatible with an obligation of result and a safety margin that is not generating prohibited over costs.

A series of standards related to prediction of building's performance from the performance of elements is now available and used widely in Europe and at international level. An improvement of the precision of these prediction methods, and an adaptation to lightweight constructions such as steel or wood frame constructions is desirable.

5. To develop evaluation criteria of acoustic quality of buildings and building elements which are relevant, but nevertheless simple and comprehensible by the end-users.

Rating of sound insulation for buildings and building elements is available for most of products and building performances. They are internationally used in prescriptions and regulation. Rating of construction products is used within the E.U. for CE marking. In order to have a good representation of the real situations where the products are used, a great number of indices have been made available, which results into a complexity hardly understandable by non-acousticians. Since more and more building products are made available directly to the public in stores for self use, simplified comprehensive indices may be developed. This may apply to products like floor coverings, linings, window panes, doors, absorbing material directly selected by the public.

6. To develop measurement methods of building acoustic performance representative of the real situations, and consistent with annoyance or satisfaction felt

Field measurement methods at two levels of precision (engineering and survey), and for most building performances, are already available. They are widely used to prove the requirements fulfilment.

Expertise methods, using different techniques (vibration, intensity, shielding), may be useful to make detailed analyses of situations where the target is not attained

7. To maintain a close coordination with the parallel ISO technical committee ISO (ISO/TC 43/SC 2) using wherever possible the procedure of Vienna's agreements. However reserving specific CEN standards to situations concerning the construction products directive or requiring target dates of publication incompatible with an international consensus.

The test codes under development to improve the measurement precision of acoustic performances of window panes and plaster board partitions on steel studs are typical of a European matter.

These test codes will be made available to ISO but they may be of minor interest since the products and the workmanship is so different in other continents.

#### **4.2 Identified strategies to achieve the CEN/TC's defined objectives.**

- Pre-normative research is necessary for items 1, 2, 3, 4, and 6. Financial support is to be sought by the building industry for the different family of product and by the European commission State (HORIZON 2020) for more basic research.
- Organisation of round robin tests is necessary to achieve item 2. This is currently supported by the manufacturers and the laboratories. The participation of CEN new members to the WG's and the round robin tests will be an efficient way of integration.
- The cooperation with construction product TCs is essential to express the needs and bring the knowledge on the product and its use in the building; Joint working groups being now forbidden, new solutions have to be found as introduction of product TC WG members into CEN/TC126 WGs.
- As far as possible, it is desirable that the convenor of working groups at CEN and ISO be the same for the same subject. The chairpersons of CEN- and ISO-TCs shall harmonize their strategy and program of work
- The CEN Management Centre should provide procedures to ensure an effective coordination between product TCs and horizontal TCs. For example, make it mandatory for product TCs to transmit any committee draft including acoustic statements to CEN/TC 126 for comments

#### **4.3 Environmental aspects**

The environmental issue addressed by CEN/TC 126 standardization works is the Protection against noise. In the new work items and for activation of existing work items, the environmental aspect "Noise/Vibration" is chosen and it is addressed with the existence of acoustic expertise in the working group in charge of the corresponding project.

Environmental expertise is present in CEN/TC 126 and is rare in construction TCs (construction products and other horizontal building TCs). CEN/TC 126 has an educational role to play in support to experts from these construction TCs who are keen to include acoustic aspects in their standards and to correctly treat the acoustic performance of the construction elements and buildings.

CEN/TC 126 offers technical support to construction products & other horizontal building technical committees in order to facilitate the use of acoustic issues by other construction TCs:

- The CEN technical report CEN/TR 15226 *Building products - Treatment of acoustics in product technical specifications* was made available therefore;
- Dedicated working groups are asked to provide technical support to construction products & other horizontal building technical committees: CEN/TC 126/WG 10 Acoustic Guidance for CEN/TC 33 (Doors and windows), a strong liaison with CEN/TC 129 (Glass in buildings) with an shared Working Group; and CEN/TC 126/WG 5 Coordination working group for all other construction/building technical committees;
- Building acoustics events: open meetings, CEN seminar, coordination meetings...

## **5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC WORK PROGRAMME**

The key objectives mentioned above can be met with a reasonable probability of success only if the intellectual assets currently available to the TC are fully and efficiently utilized. The key to future progress is the ability of the member bodies to staff the key working groups with knowledgeable experts from a wide range of their national constituencies so that diverse views will insure a well-formulated technical standard fully accounting for the views of all prospective standards users.

For many items validation of a test method is dependent upon funding being available to undertake the necessary prenormative research. EURAMET EMPIR programme will be of great help for this.

Problems have been identified related to the lack of acoustical expertise in many product TCs concerning building acoustics which makes cooperation difficult, notably due to the limited number of experts of CEN/TC 126 with the resources to do such work.

It must be noted that i.e. because of the many non-commercial aspects of the work of CEN/TC 126, many experts participate on a voluntary and at times even self-paid basis. This obviously sets a limit to the available resources and creates problems and resignation in meeting the increasingly stricter progress requirements of the CEN.

Finally, it must be noted that the maintenance of the existing standards requires a considerable amount of work (updating, technical amendments (e.g. to cover the uncertainty issue which is becoming increasingly important) and complete revisions to keep the standards technically sound and up to date and this already takes up an important amount of the available resources.