

## **BUSINESS PLAN**

### **CEN/TC 211 Acoustics**

#### **EXECUTIVE SUMMARY**

CEN/TC 211 was established in 1990 and has the following scope:

“Standardization in the field of acoustics, including methods of measuring acoustical phenomena, the generation, transmission and reception of sound, all aspects of the effects of sound on man and his environment, and methods of noise reduction. Excluded: acoustical performance requirements and measurement methods for building components and buildings; acoustical performance requirements for hearing protectors”.

Today, CEN/TC 211 has developed 86 European standards, and 10 new standards or revisions are in preparation at various stages of development. These standards provide information and guidance to practitioners, scientists and authorities around Europe.

Acoustics includes all aspects of generation, propagation, transmission, reproduction, reception, measurement and the effects of sound, and noise affects virtually every aspect of human endeavour. The main objectives of the standards are to establish a good technical basis for noise reduction measures, for prevention, diagnose and therapy for health effects, including annoyance, due to noise. The standards provide guidance to the acoustic adequacy for the basic design of machines, vehicles, and buildings, and are important for the prevention of trade barriers.

The stakeholders are manifold, including industry, community, public authorities, test laboratories and consulting engineers, research institutes, health and safety experts and inspectors, physiologists and audiologists, communication engineers, and trade and consumer groups. A number of European EU directives, concerning machinery safety, noise emission in the environment, and personal protective equipment, have significantly affected the work and the priorities of CEN/TC 211.

It is a basic philosophy not to set limits for noise in standards but to provide the technical basis for information based on which users can make a valid comparison of different products with regard to their acoustic properties and make their own choice. CEN/TC 211 shares a basic responsibility for all European standards with provisions for noise and therefore maintains a close cooperation with a great number of other committees concerning noise from specific products.

To ensure a world wide rather than a regionally restricted recognition of the standards of CEN/TC 211 its member bodies have decided to allocate essentially all of their efforts in the participation in the work of ISO/TC 43 "Acoustics" and ISO/TC 43/SC 1 "Noise". It is preferred to establish the European standards by direct implementation of the relevant ISO standards through the parallel adoption procedures of the Vienna agreement (see also 4.2).

The work of CEN/TC 211 will help to pave the way to a higher quality of life resulting from lower noise exposure levels by reduction of the risk for hearing damage and annoyance due to noise for all humans in public, working, and private environments.

This Business Plan provides answers to basic questions about the Technical Committee, its goals and accomplishments. Questions as well as comments on its contents or the activities of the TC are welcome. Please contact the CEN/TC 211 secretariat at [agnes.sayer@din.de](mailto:agnes.sayer@din.de).

Persons interested in participating in the work of CEN/TC 211 should contact their country's CEN national member body for information.

## **1 BUSINESS ENVIRONMENT OF THE CEN/TC**

### **1.1 Description of the Business Environment**

#### **1.1.1 Introduction**

The following political, economic, technical, regulatory, legal and social 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 the relevant standard development processes and the content of the resulting standards.

#### **1.1.2 General**

Acoustics is the science of

- generation
- propagation
- transmission
- reception
- prediction
- protection
- reproduction
- measurement, and
- the effects of sound.

It is intertwined with our lives in many ways. There is a positive aspect of sound, for example, in human communication, culture, technology, medicine and navigation, but also a rather negative one since, in connection with traffic, manufacturing, community activities and sports, sound can turn into noise. Noise annoys and irritates humans and may lead to negative psychological effects. Exposure to intense noise over long periods can lead to hearing damage and other physiological impairments.

Standardization in the field of acoustics covers both the negative and positive aspects of sound. Its major objectives are

- to establish methods to determine the acoustical quality of products (emission of sound sources)
- to harmonize noise measurement methods in order to establish a good basis for the information on noise and for noise reduction measures
- to establish methods to predict levels of noise
- to harmonize measurement methods for the effects of noise on human hearing functions in order to avoid, diagnose and give therapy for hearing damage
- to establish methods to determine the acoustical quality of rooms
- to harmonize methods concerning the assessment of noise exposure in rooms and in the environment.

The European standards produced by CEN/TC 211 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 prognostication.

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### **1.1.3 Specific areas**

The noise control market is generated by the following aspects:

- consumer demands (noise control in cars, noise control of domestic equipment, etc.; this part is market driven),
- the protection of workers (occupational noise; driven by law),
- the protection of people in their domestic environment against noise from outdoor sources (environmental noise; driven by law).

The noise market related to occupational and environmental noise has two complementary sides:

- the financial damage due to noise,
- business opportunities (sale of products and services).

The financial damage is indicating the potential market for noise control because, at a macro scale, the costs of noise control shall not exceed the costs of damage due to noise.

A large number of European standards are mandated and enable compliance with European Directives according to the New Approach. European standards have to be implemented by the member states of CEN replacing potentially existing national standards. Therefore, European standards have a higher impact for the CEN member countries than ISO standards, and it is therefore essential that these standards are linked to the ISO standards in accordance with the intention in this Business Plan.

### **1.1.4 Stakeholders**

#### **a) Industry**

Manufacturers and users of noisy machines, noise reducing devices, acoustical materials, have a vital interest in the specification of harmonized and practice-oriented test methods and in other related guidance to meet regulatory requirements and consumer expectations when designing new products and to achieve transparency in noise declarations and establishment of noise control performance. Manufacturers of sound measuring instruments and software have an interest in the application of their products. The framework of standardization 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 10 million people are exposed to damaging levels of noise at work, most of whom are at risk because of the use and operation of noisy machinery. In addition, 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.

In order to improve the quality of life it is of general interest to the community to reduce noise and protect against noise in all its aspects, outdoors (including noise inside vehicles), indoors (at the work place) and where people are in public and in private places. Acoustic standardization can provide guidance on all aspects of the measurement and reduction of noise and information on noise generated by products and, therefore, serves this global interest.

#### **c) Public authorities**

Public authorities deal with the development and application of legislation in the areas of occupational and environmental noise. 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 is an increasing number of requests for standardized methods of measurement 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.

#### **f) Health and safety experts and inspectors**

In many industrialized countries, noise-induced hearing loss is at present the most widely recognized occupational disease. Noise reduction at the work place, selecting low-noise machines, hearing protection, and hearing conservation programmes are of major concern for improving working conditions and reducing the compensations to be paid.

#### **g) Physiologists and audiologists**

Their work includes, for example, definition of normal hearing, measurement of main hearing functions, hearing rehabilitation, effects of noise on man, calibration and proper use of audiometers, and hearing conservation programmes.

#### **h) Communication engineers**

Their work includes, for example, telecommunications, radio and television, and sound studios, as well as acoustical warning signals and related equipment.

#### **i) Trade and consumer groups**

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

### 1.1.5 Regulatory and legal issues

A number of political, economical, social, technical, legal and international factors either directly require some or all of the standardization activities proposed by the CEN/TC, or significantly influence the way these activities are carried out.

The following new approach EU directives for products:

- Directive 2006/42/EC Machinery safety
- REGULATION (EU) 2016/425 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC

as well as:

- Directive 2003/10/EC of 2003-02-06 on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (noise)
- Directive 2002/49/EC of 2002-06-25 on environmental noise (amended by other directives and consolidated in 2021-07-29)
- Directive 2000/14/EC of 2000-05-08 on noise from equipment for use outdoors
- Directive 93/42/EEC of 1993-06-14 on medical devices
- Directive 2014/540/EC 2014-04-16 on the sound level of motor vehicles and of replacement silencing systems
- Regulation (EC) No 661/2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor
- Regulation (EU) 2020/740 on the labelling of tyres with respect to fuel efficiency and other parameters
- Regulation (EU) No 598/2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC

form the basis for a number of the activities and standards of CEN/TC 211.

Although noise is of significant environmental impact and is therefore a major subject of standardization only selected parts of the international standardization activities on environmental noise in ISO/TC 43/SC 1 (see 1.1.2) are at present implemented by CEN/TC 211.

## 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 the CEN/TC.

It has not been possible to get figures for the value of the complete work of CEN/TC 211, notably since this committee does not prepare product standards, but fragmental figures for various parts of the work are:

- The social and economical cost of occupational deafness is very high, 100 k€ as an order of magnitude for one single person. The yearly direct cost of occupational deafness is 60 M€ in France and believed to be around 200 M€ in Germany. Noise at work is also a cause of accidents due to the disturbed perception of speech and danger signals.

- The value of trade in machinery within Europe is several hundred billion €. Since safety aspects are now better dealt with, “less noise” has become a sales argument for the machinery put on the market for sale in the EU and for export as well. One reason is that the use of quieter machines improves the working conditions and therefore increases productivity.
- For traffic noise, the median value of the change in noise perceived by households is estimated to be 25 €/per dB (Lden), per household and per year in Europe.
- The products for noise control consists of two major parts:
  - Explicit products like measuring equipment, software, consulting services, noise control devices.
  - An implicit part, which only partly overlaps with the first part:
    - (1) many buildings and nearly every modern machine contains noise control elements; the related costs are often low, but the enormous number of systems will nevertheless generate very large figures;
    - (2) in developed countries the costs of traffic infrastructure contain significant parts related to noise control (in Europe between 100 and 1000 million €/year is spent for noise barriers, special road surfaces, insulation of buildings and other measures related to the reduction of road traffic noise).

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

A great number of the standards prepared by CEN/TC 211 are basic standards directed to sector specific CEN product TCs enabling them to draft noise test codes on the basis of the ‘Type-B Standards’.

The work of CEN/TC 211 will contribute strongly to an improvement of health. It is also important for the reduction of trade barriers and for a cost-effective approach in the field (at a macro level the use of many different methods is not cost-effective).

Technical standards produced under the auspices of CEN/TC 211 directly impact public and private environments. These standards also provide guidance as to the acoustic adequacy of the basic design of machines, vehicles and buildings. The results of the CEN/TC 211 standards will help pave the way to a higher quality of life resulting from lower noise exposure levels by reduction of the risk for hearing damage and annoyance due to noise for all humans 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, CEN/TC 211 proposes the following objectives and strategic directions for its future work:

The main objective of the TC is to improve the market-oriented approach and to produce standards, which fully satisfy the needs of the market (the users).

A basic objective is not to set noise limits in standards but to specify methods of measurement and evaluation so that, for example, all noise measurements carried out in accordance with European Standards yield noise data, which are comparable for noise exposure, immission and emission. This concept is reflected in the following statement from a resolution adopted at the first meeting of CEN/TC 211 and subsequently recognized by both BTS 2 and BTS 4:

(from doc. CEN/TC 211 N 42, resolution 4)

*CEN/TC 211 shall be solely responsible for establishing methods for measuring and assessing noise emitted by different sources, the effect of noise on people, and personal protection from noise. Other CEN and CENELEC technical committees dealing with acoustical measurements, requirements, and methods of noise reduction shall establish direct contact with CEN/TC 211 in order to decide mutually the appropriate method for the establishment of the CEN or CENELEC Standard concerned.*

This does not mean that all noise or sound insulation measurement methods are necessarily to be prepared within CEN/TC 211. Basic acoustical measurement standards ("type-B standards") are prepared within CEN/TC 211. However, cooperation (the form of which is decided upon from case to case) must be established with other pertinent CEN technical committees in the preparation of European standards on noise from particular products and noise test codes ("type-C standards") in order to fulfil the intent of the above resolution. Thus, in addition to the major parties listed in 2, manufacturers of particular types of machinery may also participate in CEN/TC 211 on particular items or these may be prepared jointly under the auspices of relevant CEN product committees in close cooperation with CEN/TC 211.

Much of this work concerning machinery noise is based on EN ISO 12100<sup>1)</sup> and thus complies with EC Directive 2006/42/EC<sup>2)</sup>, too.

The most efficient and economical method for noise control is noise reduction at the source by means of special measures in the process of designing and constructing equipment. For this purpose, generally accepted methods for the evaluation and prediction of noise emission values of the equipment, under actual operating conditions and in the intended working environment, and the noise control performance, are needed to assist manufacturers and consulting engineers.

To avoid ambiguities, standards prepared by CEN/TC 211 traditionally contain mandatory requirements with respect to test methods, test conditions, measuring equipment, etc. In some

<sup>1)</sup> EN ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)

<sup>2)</sup> Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)

areas, however, guidance documents are needed, for example, to select an appropriate measurement standard from a family of related standards, to provide general information on a variety of noise reduction measures for the benefit of non-expert users, etc. Even if these documents are less stringent, it is the policy of CEN/TC 211 to issue them as standards rather than as Technical Specifications.

Due to the great diversity of major stakeholders (see 1.1.4) and their specific requests, as expressed by New Work Item Proposals from member bodies, CEN/TC 211 feels unable to give priority to a specific field but elaborates a great number of standards for different groups in parallel.

There are no strict borderlines between the following groups:

### **Expanding work areas**

- application of basic machinery noise standards in the preparation of noise test codes in cooperation with other TCs
- machinery noise emission, validation of measurement methods
- recommended practice in machinery noise control
- environmental noise measurement and evaluation
- measurement and evaluation of occupational noise
- noise prediction methods
- hearing aid fitting management
- improvement in dealing with uncertainty in noise measurement standards

### **Areas where basic standards are available but under revision**

- basic standards on the measurement, description and declaration of machinery noise
- basic standards for the measurement of hearing protector attenuation
- basic standards for audiometry
- acoustic quantities, units and reference quantities

### **Areas under steady progress**

- transport noise, indoors and outdoors
- noise reduction, noise control performance
- sound propagation, indoors and outdoors

### **Areas where research is needed**

- structureborne noise emission
- measurement and evaluation of emission of sound sources
- measurement and evaluation of environmental noise
- measurement and evaluation of human hearing characteristics
- measurement and evaluation of impulsive noise, immission and emission
- advanced methods of measurement of hearing protector attenuation and effects on auditory communications
- measurement uncertainty
- measurement of noise from rail bound vehicles



- sound quality of communication systems
- active noise control

#### **Potential future possibilities**

- speech and voice communication with computers
- automatic speech recognition
- psychoacoustics in relation to product sound quality
- new types of test methods, new measuring techniques made possible by modern technology

#### **4.2 Identified strategies to achieve the CEN/TCs defined objectives**

Formally, the result of voting of the member bodies on new work item proposals and not the TC itself decides on the acceptance of new work items. Therefore, the only strategic element left is the discussion of new work item proposals at plenary meetings, which can guide the member bodies but this is not decisive.

Due to the need for European Standards as a basis for the implementation of the machinery directive of the EU, over the recent years priority has been given to the preparation of machinery noise standards. In order to avoid duplication of work and the creation of technical barriers to trade, close liaisons with ISO/TC 43 and ISO/TC 43/SC 1 for acoustics and noise have been established. As a result, the ISO standards are implemented directly or by parallel voting procedures. This way of operating will help to open the market and permit member bodies from outside Europe to participate.

Further, in view of the overall responsibility for noise standards in CEN, TC 211 has established close co-operation with a large number of other CEN/TCs, in order to find the best way of establishing consistent machinery noise standards.

The present number of work items is at the maximum of what the available resources can handle. In order to maintain the activities at this level, the following priorities are suggested:

- revision of basic standards on measurement of noise emission and application of these standards in the preparation of C-standards (e.g. by providing technical assistance to other TCs)
- environmental noise
- transport noise
- noise prediction

It should be noted that in many fields of the work of CEN/TC 211, the cooperation and contacts established by the process of preparing the standards is just as important as the publication of the final European Standards. Over the past years, CEN/TC 211 has found itself bridging all aspects of the many interested parties in the standardization work, ranging from science to politics. It is expected that the increasing use of modern technology will both open and speed up the standards work, resulting in an efficient and cost-effective process for the preparation of European Standards in the area of acoustics.

## **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, see notably those referred to in the "Objectives of CEN/TC 211" section.

Problems have been identified related to the lack of acoustical expertise in many product TCs concerning noise which makes cooperation difficult, notably due to the limited number of experts of CEN/TC 211 with the resources to do such work.

It must be noted that i.a. because of the many non-commercial aspects of the work of CEN/TC 211, 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.

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.