Overview important acoustical standards

EN ISO 140-1 (1998)

This part of ISO 140 lays down the **specifications concerning laboratories** for sound insulation measurements of building elements. It applies to laboratories with suppressed radiation from flanking elements.

EN ISO 140-2 (1998)

This part of ISO 140 specifies procedures for assessing the **uncertainty** in the acoustical measurements described in ISO 140-3 to ISO 140-9 due to random and systematic influences.

It gives guidelines for

- determination of the repeatability value r and reproducibility value R
- verification of repeatability values r and reproducibility values R for different measurement arrangements in one laboratory and for comparisons between different laboratories
- application of repeatability values r and reproducibility values R in practice

Tentative repeatability values and reproducibility values of the test methods according to ISO 140-3, ISO 140-4 and ISO 140-6 to 140-8 are given in annex A.

EN ISO 140-3 (1995)

This part of ISO 140 specifies a **laboratory method** of measuring the **airborne sound insulation** of building elements such as walls, floors, doors, windows, façade elements and façades, except those classified as small building elements (for which a measuring method is specified in ISO 140-10).

The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

The measurements are performed in laboratory test facilities in which transmission of sound on flanking paths is suppressed. Results of measurements made in accordance with this part of ISO therefore shall not be applied directly in the field without accounting for other factors affecting sound insulation, especially flanking transmission and loss factor.

EN ISO 140-4 (1998)

This part of ISO 140 specifies **field methods** for measuring the **airborne sound insulation** properties of interior walls, floors and doors between two rooms under diffuse sound field conditions in both rooms, and for determining the protection afforded to the occupants of the building.

The methods give values for airborne sound insulation which are frequency dependent. They can be converted into a single number, characterizing the acoustic performance, by application of ISO 717.

The results obtained can be used to compare sound insulation between rooms and to compare actual sound insulation with specified requirements.

Laboratory measurements of airborne sound insulation of building elements are dealt with in ISO 140-3

Field measurements of airborne sound insulation of façade elements and façades are dealt with in ISO 140-5.

EN ISO 140-5 (1998)

This part of ISO 140 specifies two series of methods (element methods and global methods) for measurement of the airborne sound insulation of façade elements and whole façades, respectively. **The element methods** aim to estimate the sound reduction index of a façade element, for example a window. The most accurate element method uses a loudspeaker as an artificial sound source. Other, less accurate, element methods use available traffic noise. **The global methods**, on the other hand, aim to estimate the outdoor/indoor sound level difference under actual traffic conditions. The most accurate global methods use actual traffic as sound source. In addition, a loudspeaker may be used as an artificial sound source.

The element loudspeaker method yields an apparent sound reduction index which, under certain circumstances, can be compared with the sound reduction index measured in laboratories in accordance with 140-3 or 140-10. This method is the preferred method when the aim of the measurement is to evaluate the performance of a specified façade element in relation to its performance in the laboratory.

The element road traffic method will serve the same purposes as the element loudspeaker method. It is particularly useful when, for different practical reasons, the element loudspeaker method cannot be used. These two methods will often yield slightly different results. The road traffic method tends to result in lower values of the sound reduction index than the loudspeaker method.

The global road traffic method yields the real reduction of a façade in a given place relative to a position 2m in front of the façade. This method is the preferred method when the aim of the measurement is to evaluate the performance of a whole façade, including all flanking paths, in a specified position relative to nearby roads. The results cannot be compared with that of laboratory measurements.

The global loudspeaker method yields the sound reduction of a façade relative to a position 2m in front of the façade. This method is particularly useful when, for different practical reasons, the real noise source cannot be used. The result cannot be compared with that of laboratory measurements.

EN ISO 140-6 (1998)

This part of ISO 140 specifies a **laboratory method** for measuring **impact noise transmission** through floors by using a standard tapping machine. The method is applicable to bare floors and also to floors with coverings.

The results obtained can be used to compare the impact sound insulation properties of floors and to classify floors according to their sound insulation capabilities.

Field measurements of impact sound insulation of floors are dealt with in ISO 140-7.

Laboratory measurements of the reduction of transmitted standard impact machine noise by floor coverings on a heavyweight standard floor are dealt with in ISO 140-8.

EN ISO 140-7 (1998)

This part of ISO 140 specifies field methods for measuring the impact sound insulation properties of building floors by using a standard tapping machine. The method is applicable to bare floors and also to floors with coverings.
The results obtained can be used to compare the impact sound insulation properties of floors and to compare the apparent impact sound insulation of floors with specified requirements.

Laboratory measurements of impact sound insulation of floors are dealt with in ISO 140-6

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a solid standard floor are dealt with in ISO 140-8.

EN ISO 140-8 (1998)

This International standard specifies a method for measuring the acoustical properties of floor coverings from the viewpoint of reducing impact noise transmission.

This International Standard is applicable to all floor coverings, whether single or multi-layered coverings, they may be factory-assembled or assembled at the test site. The test method applies only to laboratory measurements. It does not contain any provision that permits an assessment of the effectiveness of a floor covering in situ.

EN ISO 140-9 (1985)

This part of ISO 140 specifies a **laboratory method** of measuring the airborne sound insulation of a **suspended ceiling** with a plenum of defined height mounted above an acoustical barrier which separates two rooms of a specified test facility.

This method utilizes a laboratory space so arranged that it simulates a pair of horizontally adjacent, typical offices or rooms sharing a common suspended ceiling system, plenum space and a dividing wall. The dividing wall extends to the underside of the ceiling system which at the junction is either continuous or discontinuous.

The quantity being measured is the airborne sound insulation between two rooms of a specified test facility when the sound transmitted by paths other than the suspended ceiling and common plenum space is negligible. This quantity is called the suspended ceiling normalized level difference.

The method may be extended to include the study of composite ceiling systems comprising the ceiling material and other components such as luminaries and ventilating systems.

The method may also be extended to the study of the additional insulation that may be achieved by auxiliary systems, such as material used either as plenum barriers or as backing for all of, or part of, the ceiling.

EN ISO 140-10 (1991)

This part of ISO 140 gives a **laboratory method** of measuring airborne sound insulation under diffuse field conditions of such **small building elements** as are defined below.

It is intended that the results obtained will be used to develop building elements with appropriate acoustical properties, to classify such elements according to their sound insulation properties and to estimate their influence on the sound insulation of partition constructions in buildings.

This part of ISO 140 applies building elements excluding windows and doors, with an area of less than 1m² and which occur in a certain number of discrete sizes with well-defined lateral dimensions and which transmit sound between two adjacent rooms or between one room and the open air independently of the adjoining building elements.

Some examples of equipment covered by this part of ISO 140 are:

Transfer air devices, airing panels (ventilators), outdoor air intakes, electrical raceways (cable ducts), transit ceiling systems

The method given is not primarily intended for components that constitute part of an integrated unit for which the associated sound transmission might depend on an interplay of components.

EN ISO 140-12 (2000)

Measurement of sound insulation in buildings and of building elements
Part 12 : Laboratory measurement of room-to-room airbone and impact sound insulation of an access floor

EN ISO 717-1 (1996)

This part of ISO 717

a) defines single-number quantities for airborne sound insulation in buildings and of building elements such as walls, floors, doors and windows;

b) takes into consideration the different sound level spectra of various noise sources such as noise sources inside a building and traffic outside a building; and
c) gives rules for determining these quantities from the results of measurements carried out in one-third-octave bands in accordance with ISO 140-3, ISO 140-4, ISO 140-5, ISO 140-9 and ISO 140-10

The single-number quantities in accordance with this part of ISO 717 are intended for rating the airborne sound insulation and for simplifying the formulation of the acoustical requirements in building codes. The required numerical values of the single-numbered quantities are specified according to varying needs. The single-number quantities are based on results of measurements in one-third-octave bands or octave bands.

For laboratory measurements made in accordance with ISO 140-3, ISO 140-9 and ISO 140-10, single-number quantities should be calculated using one-third-octave bands only.

EN ISO 717-2 (1996)

This part if ISO 717

- defines single-number quantities for the impact sound insulation in buildings and of floors, and
- gives rules for determining these quantities from the results of measurements carried out in one-third octave bands according to ISO 140-6 and ISO 140-7

The single-number quantities according to this part of ISO 717 are intended for rating the impact sound insulation and for simplifying the formulation of acoustical requirements in building codes. The required numerical values of the single-number quantities can be specified according to varying needs.

Methods for obtaining single-number quantities

- for floor coverings from the results of measurements carried out in one-third octave bands according to 140-8, and
- to bare concrete floors according to their performance in combination with soft floor coverings

are described in annexes A and B

EN ISO 11654 (1997)

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prEN ISO 10848 (1999)

The general standard describes measurement methods to be performed in dedicated test facility in order to characterise the performances of one or several building components regarding the flanking transmissions.

These performances can be used to compare different products, or to express a requirement, or to input into prediction methods, such as the series prEN 12354-1 and prEN 12354-2.

The general standard includes 4 parts:

Part 1 - Frame document

- Definition.

- General requirements for test rooms.

- Measurement methods.

- Selection on the relevant method according to the type of building element or junction element.

Part 2

- Application to light element when the junction has a small influence.

Part 3

- Application to light elements when the junction has a substantial influence.

Part 4

- All other cases

EN ISO 1996-1 (1982)

This part of ISO 1996 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

This International Standard forms the basic for further parts in the ISO 1996 series.

EN ISO 1996-2 (1987)

This part if ISO 1996 methods for the acquisition of data which provide descriptors that enable

a. a description of the environmental noise in a specified area of land to be made in a uniform way
b. the compatibility of any land use activity or projected activity to be assessed with respect to existing or predicted noise

EN ISO 1996-3 (1987)

This part of ISO 1996 lays down guidelines for the specification of noise limits and describes methods for the acquisition of data that enable specific noise situations to be checked for compliance with specified noise limits.

EN ISO 3382 (1997)

This International Standard specifies a method for the measurement of reverberation time in auditoria by describing the state of occupancy of an auditorium for which the reverberation time is required, the measurement procedure, the apparatus necessary, and the method of evaluating the data and of presenting the test report.

EN ISO 9614-1 (1995)

This part of ISO 9614 specifies a method for measuring the component of sound intensity normal to a measurement surface which is chosen so as to enclose the noise source(s) of which the sound power level is to be determined. The one-octave, one-third-octave or band-limited weighted sound power level is calculated from the measured values. The method is applicable to any source for which a physically stationary measurement surface can be defined, and on which the noise generated by the source is stationary in time. The source is defined by the choice of measurement surface. The method is applicable in situ, or in special purpose test environments.

This part of ISO 9614 is applicable to sources situated in any environment which is neither so variable in time as to reduce the accuracy of the measurement of sound intensity to an unacceptable degree, nor subjects the intensity measurement probe to gas flows of unacceptable speed or unsteadiness.

In some cases, it will be found that these test conditions are too adverse to allow the requirements of this part of ISO 9614 to be met. In particular, extraneous noise levels may vary to an excessive degree during the test. In such cases, the method given in this part of ISO 9614 is not suitable for determination of the sound power level of the source.

This part of ISO 9614 specifies certain ancillary procedures to be followed in conjunction with the sound power determination. The results are used to indicate the quality of the determination, and hence the grade of accuracy. If the indicated quality of the determination does not meet the requirements of this part of ISO 9614, the test procedure should be modified in the manner indicated.

EN ISO 9614-2 (1996)

This part of ISO 9614 specifies a method for measuring the component of sound intensity normal to a measurement surface which is chosen so as to enclose the noise source(s) of which the sound power level is to be determined.

Surface integration of the intensity component normal to the measurement surface is approximated by subdividing the measurement surface into contiguous segments, and scanning the intensity probe over each segment along a continuous path which covers the extent of the segment. The measurement instrument determines the average normal intensity component and averaged squared sound pressure over the duration of each scan. The scanning operation may be performed either manually or by means of a mechanical system.

Band-limited weighted sound power level is calculated from the measured octave or one-third-octave band values. The method is applicable to any source which a

physically stationary measurement surface can be defined, and on which the noises generated by the source under test and by other significant extraneous sources are stationary in time. The source is defined by the choice of measurement surface. The method is applicable in situ, or in special-purpose test environments.

This part of ISO 9614 specifies certain ancillary procedures to be followed in conjunction with the sound power determination. The results are used to indicate the quality of the determination, and hence the grade of accuracy. If the indicated quality of the determination does not meet the requirements of this part of ISO 9614, the test procedure is to be modified in the manner indicated.

This part of ISO 9614 is applicable to sources situated in any environment which is neither so variable in time as to reduce the accuracy of the measurement of sound intensity to an unacceptable degree, nor subjects the intensity measurement probe to gas flows of unacceptable speed or unsteadiness.

In some cases, it will be found that these test conditions are too adverse to allow the requirements of this part of ISO 9614 to be met. Extraneous noise levels may exceed the dynamic capability of the measuring instrument or may vary to an excessive degree during the test. In such cases, the method given in this part of ISO 9614 is not suitable for determination of the sound power level of the source.

prEN ISO 9614-3

This part of ISO 9614 specifies a method for measuring the component of sound intensity normal to a measurement surface which is chosen so as to enclose the sound source(s) of which the sound power level is to be determined.

Surface integration of the intensity component normal to the measurement surface is approximated by subdividing the measurement surface into contiguous partial surfaces, and scanning the intensity probe over each partial surface along a continuous path which covers the extent of the partial surface. the measurement instrument determines the averaged normal intensity component and averaged squared sound pressure over the duration of each scan. the scanning operation may be performed either manually or by means of a mechanical system.

The octave band or band-limited weighted sound power level is calculated from the measured octave or one-third-octave band values. the method is applicable to any source for which a physically stationary measurement surface can be defined, and on which the noises generated by the source under test and by other significant extraneous sources are stationary in time. The source is defined by the choice of measurement surface. The method is applicable *in situ*, or in special-purpose test environments.

This part of ISO 9614 specifies certain ancillary procedures, described in annex B, to be followed in conjunction with the sound power determination. The results are used to indicate the quality of the determination, and hence the grade of accuracy. If the indicated quality of the determination does not meet the requirements of this part of ISO 9614, the test procedure is to be modified in the manner indicated.

This part of ISO 9614 does not apply in any frequency band in which the sound power of the source is found to be negative on measurement.

EN 12354-1 (2000)

This document describes calculation models designed to estimate the airborne sound insulation between rooms in buildings, primarily using measured data which characterizes direct or indirect flanking transmission by the participating building elements and theoretically derived methods of sound propagation in structural elements.

A detailed model is described for calculation in frequency bands; the single number rating can be determined from the calculation results. A simplified model with a restricted field of application is deduced from this, calculating directly the single number rating, using the single number ratings of the products.

This document describes the principles of the calculation scheme, lists the relevant quantities and defines its applications and restrictions. It is intended for acoustical experts and provides the framework for the development of application documents and tools for other users in the field of building construction, taking into account local circumstances.

The calculation models described use the most general approach for engineering purposes, with a clear link to measurable quantities that specify the performance of building products. The known limitations of these calculation models are described in this document. Users should, however, be aware that other calculation models also exist, each with their own applicability and restriction.

The models are based on experience with predictions for dwellings; they could also be used for other types of buildings provided the construction systems and dimensions of elements are not too different from those in dwellings.

EN 12354-2 (1999)

This document describes calculation models designed to estimate the impact sound insulation between rooms in buildings, primarily on the bases of measured data which characterizes direct or indirect flanking transmission by the participating building elements and theoretically derived methods of sound propagation in structural elements.

A detailed model is described for calculation in frequency bands; the single number rating of buildings can be determined from the calculation results. A simplified model with a restricted field of application is deducted from this, calculating directly the single number rating, using the single number ratings of the products.

This document describes the principles of the calculation scheme, lists the relevant quantities and defines its applications and restrictions. It is intended for acoustical experts and provides the framework for the development of application documents and tools for other users in the field of building construction, taking into account local circumstances.

The calculation models described use the most general approach for engineering purposes, with a clear link to measurable quantities that specify the performance of building products. The known limitations of these calculation models are described in this document. Users should, however, be aware that other calculation models also exist, each with their own applicability and restriction.

The models are based on experience with predictions for dwellings; they could also be used for other types of buildings provided the construction systems and dimensions of elements are not too different from those in dwellings.

EN 12354-3 (2000)

This document describes a calculation model designed to estimate the sound insulation or the sound pressure level difference of a façade or other external surface of a building. The calculation is based on the sound reduction index of the different elements from which the façade is constructed and it includes direct and flanking transmission. The calculation gives results which correspond approximately to the results from field measurements according to EN-ISO 140-5. Calculations can be carried out for the frequency bands or for single number ratings.

The calculation results can be used also for calculating the indoor sound pressure level due to for instance road traffic.

This document describes the principles of the calculation scheme, lists the relevant quantities and defines its applications and restrictions. It is intended for acoustical experts and provides the framework for the development of application documents and tools for other users in the field of building construction, taking into account local circumstances.

The model is based on experience with predictions for dwellings; they could also be used for other types of buildings provided the dimensions of constructions are not too different from those in dwellings.

EN 12354-4 (2000)

This document describes a calculation model for the sound power level radiated by the envelope of a building due to airborne sound inside that building, primarily by means of measured sound pressure levels inside the building and measured data which characterize the sound transmission by the relevant elements and openings in the building envelope. The prediction of the inside sound pressure level from knowledge of the inside sound sources is outside the scope of this document.

These sound power levels, together with those of other sound sources in or in front of the building envelope, from the basis for the calculation of the sound pressure level at a chosen distance from a building as a measure for the acoustic performance of buildings. The prediction of the outdoor sound propagation is outside the scope of this document. However, for simple propagation conditions an approach is given for the estimation of the sound pressure level.

This document describes the principles of the calculation scheme, lists the relevant quantities and defines its applications and restrictions. It is intended for acoustical experts and provides the framework for the development of application documents and tools for other users in the field of building construction, taking into account local circumstances.

ISO 354 (1985) / EN 20354 (1993) / pr EN ISO 354 (2000)

This international standard specifies a method of measuring the sound absorption coefficient of acoustical materials used as wall or ceiling treatments, or the equivalent sound absorption area of objects, such as furniture, persons or space absorbers, n a reverberation room. It is not intended for measuring the absorption characteristics of weakly damped resonators.

The results obtained can be used for comparison purposes and for design calculation with respect to room acoustics and noise control.

ISO 5136 (2003)

This International Standard specifies a method for testing ducted fans and other air-moving devices to determine the sound power radiated into an anechoically terminated duct on the inlet and/or outlet side of the equipment.

It applies to fans which emit steady, broad-band, narrow-band and discrete-frequency sound and to air temperatures between -50°C and +70°C. The test duct diameter range is from 0,15 m to 2 m. Test methods for small (d <0,15m) and large (d >2m) test ducts are described in the informative Annexes H and J, respectively.

EN ISO 3741 (1999)

This international Standard specifies a direct method and a comparison method for determining the sound power level that would be produced by a source operating in a environment at standard meteorological conditions corresponding to a characteristic impedance of $\rho c = 400$ N.s/m³ (where ρ is the density of air and c is the speed of sound). It specifies test room requirements, source location and general rules for operating conditions, instrumentation and techniques for obtaining an estimate of mean-square sound pressure levels from which the sound power levels of the source in octave or one-third-octave bands are calculated with a grade 1 accuracy. The quantities to be measured are time-averaged sound pressure levels in frequency bands. The quantities to be determined are sound power levels with other frequency weightings calculated from the measurements in frequency bands. This standard does not provide the means to determine directivity and temporal variation of sound from a source.

In general, the frequency range of interest includes the one-third-octave bands with midband frequencies from 100 Hz to 10 000 Hz. Guidelines for the application of the specified methods in an extended frequency range in respect to lower frequencies are given in annex C. This international standard is not applicable to frequency ranges above the 10 000 Hz one-third-octave band. For higher frequencies the use of methods given in ISO 9295 is recommended.

The method specified in this International Standard is suitable for steady-noise with broad-band, narrow-band and discrete-frequency components as described in ISO 12001. The noise may be emitted from a device, machine, component or sub-assembly.

This international Standard is applicable to noise sources with volumes which are preferably not greater than 2% of the volume of the reverberation room used under test.

EN ISO 3822-1 (1999)

This part of EN ISO 3822 specifies a method of measurement, in the laboratory, of the noise emission resulting from the flow of water through appliances and equipment used in water supply installations.

The items covered include draw-off taps, in-line valves and special appliances, for example pressure reducers and water-heating appliances, all of which are hereafter referred to as “appliances”.

The method specified makes it possible to obtain comparable results of measurements in different laboratories.

EN ISO 3822-2 (1995)

This part of ISO 3822 specifies the mounting and operating conditions to be used for draw-off taps and mixing valves when measuring noise emission resulting from water flow.

The procedures described are for general use for all types of draw-off taps and mixing valves of conventional design with a recommended flow pressure range of 0.1 to 0.5 MPa.

The mounting and operating conditions apply to draw-off and mixing valve assemblies including any inlet or outlet mounting or installation unions, elbows, adaptors etc., but excluding interchangeable outlet accessories such as aerators, shower hoses, shower heads, flow staighteners etc. These outlet accessories are replaced by standardised Low-noise Flow Resistances.

When the outlet accessories mentioned above are neither interchangeable no removable then the test shall be carried out with them in place. Interchangeable outlet accessories are tested separately according to procedures specified in other parts of this European Standard.

Thermostatic mixing valves, intended for use with more than one independent draw-off tap, and bidet valves with a direct outlet into an interior part of the body of the bidet are not regarded as conventional draw-off taps or mixing valves and are not covered by this part of ISO 3822. Similarly, electrically operated valves are regarded as combined devices (solenoid valve and outlet) and are not covered by this part of ISO 3822.

The test procedures cover a range of flow pressures between 0.1 and 0.5 MPa.

EN ISO 3822-3 (1997)

This part of EN ISO 3822 specifies the mounting and operating conditions to be used for in-line valves and appliances which control the flow, pressure or temperature of the water in water supply installations, when measuring noise emission resulting from water flow.

It is applicable to in-line valves and appliances of maximum nominal size DN 32 and to systems in which the maximum water flow rate does not exceed 2 l/s.

The procedures described are for general use for all types of in-line valves of conventional design.

EN ISO 3822-4 (1997)

This part of EN 3822 specifies the mounting and operating conditions to be used for a number of appliances which cannot be regarded as draw-off or in-line valves, when measuring the noise emission resulting from water flow.

prEN ISO 10052 (2000)

This European Standard specifies field survey methods for measuring:

a) the airborne sound insulation between rooms ;

b) the impact sound insulation of floors ;

c) the airborne sound insulation of façades ; and

d) the sound pressure levels in rooms from equipment.

The methods described in this European Standard are applicable for measurements in rooms of dwellings or in rooms of comparable size with a maximum of 150 m^3.

For airborne sound insulation, impact sound insulation and façade sound insulation the method gives values which are frequency dependent. They can be converted into a single number characterizing the acoustical performances by application of EN ISO 717-1 and EN ISO 717-2. For equipment sound the results are given in A-weighted sound pressure levels.

The measurement uncertainty of results obtained using the survey method is larger than the uncertainty inherent in the corresponding test methods on engineering level.

The results obtained can be used to compare sound insulation between rooms or sound pressure levels in rooms with specified requirements or regulations.

ISO/DIS 15186-2 (2002)

This International Standard specifies a sound intensity method to determine the in-situ sound insulation of walls, floors, doors, windows and small building elements. It is intended for measurements that have to be made in the presence of flanking transmission. It can be used to provide sound power data for diagnostic analysis of flanking transmission or to measure flanking sound insulation parameters.

This International Standard is the second part of a series of three standards. This part may be used by laboratories that could not satisfy Part 1 which deals with laboratory measurements with no or little flanking transmission. The third part is ISO 15186-3 which deals measurements under laboratory conditions, at low frequencies.

Annex C discusses the effect of flanking transmission on measurements made using this standard and how intensity measurements can be used to:

- compare the in-situ sound insulation of a building element with laboratory measurements where flanking has been suppressed
- rank the partial contributions for building elements
- measure the flanking sound reduction index for one or more transmission paths (for validation of prediction models such as EN 12354-1: Buidling acoustics – Estimation of acoustic performance of buildings from the performance of products – Part 1: Airborne sound insulation between rooms)

This method gives values for airborne sound insulation, which are frequency dependent. They can be converted into a single number, characterising the acoustic performance, by application of ISO 717-1.

prEN ISO 16032 (2000)

This European Standard specifies methods for measuring the sound pressure level from service equipment in buildings incorporated rigidly to building structures. The service equipment covered by this standard is e.g.: Sanitary installations, mechanical ventilation, heating and cooling equipment, lifts, rubbish chutes, boilers, blowers, pumps and other auxiliary equipment, and motor driven car park doors.

The methods are suitable for rooms with volumes less than approximately 300 m^3 in e.g. dwellings, hotels, schools, offices and hospitals. The standard is not in general intended for measurements in large auditoria and concert halls. However, the operating conditions and operating cycles stated in clauses 8 and 9 can be used in such cases.

The equipment sound pressure level is determined as the maximum A- and optionally C-weighted sound pressure level occurring during a specified operation cycle of the equipment under test, or as the equivalent sound pressure level determined with a specified integration time calculated from octave-band measurements.

EN ISO 266 (1997)

This International Standard specifies preferred frequencies for acoustical measurements. The preferred frequencies are based on the R10 series of preferred

numbers in ISO 3. For most acoustical measurements and presentations of data frequency spacing based on a constant percentage increment in generally preferred and the test frequencies then form a geometric series. For certain acoustical measurements, however, a constant frequency increment is a suitable spacing.

This International Standard deals with the geometric series and is not intended to apply to cases where a constant frequency increment, or other particular spacing, would be more suitable, or where there may be good reasons for the adaptation or retention of other frequencies.

This International Standard does not deal with:
- frequencies for music
- all audiometric frequencies
- series other than R10 from ISO 3.

EN ISO 3743-1 (1994)

This part of ISO 3743 specifies a relatively simple engineering method for determining the sound power levels of small, movable noise sources. The measurements are carried out when the sources is installed in a hard-walled test room. A comparison method is used to determine to the octave band sound power levels of the source. The spatial average (octave-band) sound pressure levels produced by the source under test are compared to the spatial average (octave-band) sound pressure levels produced by a reference sound source of known sound power output. The difference in sound pressure levels is equal to the difference in sound power levels if conditions are the same for both sets of measurements. The A-weighted sound power level is then calculated from the octave-band sound power levels.

EN ISO 3743-2 (1994)

This part of ISO 3743 specifies a relatively simple engineering method for determining the sound power levels of small, movable noise sources. The measurements are carried out when the source is installed in a specially designed room having a specified reverberation time over the frequency range of interest. The A-weighted sound power level of the source under test is determined from a single A-weighted sound pressure level measurement at each microphone position, rather than from a summation of octave-band levels. This direct method eliminates the need for a reference sound source, but requires the use of a special reverberation test room. The direct method is based on the premise that the sound pressure level, averaged in space and time in the test room, can be used to determine the sound power level emitted by the source. The properties of the special reverberation test room are chosen so that the room's influence on the sound power output of the equipment under test is small. The number of microphone positions and source locations required in the test room are specified. Guidelines for the design of special reverberation rooms are given in annex B.

In addition to the direct method, a comparison method is also described. However, since the requirements on the test room for the comparison method of ISO 3743-1 are considerably less restrictive, it is recommended that the comparison method of ISO 3743-1 be used if a special reverberation test room is not available.

ISO 226 (1992)

This International Standard specifies the relations existing, for the condition of equal-loudness level, between the sound pressure levels and frequencies of pure (sinusoidal) continuous tones in the following conditions:

a. the source of sound is directly in front of the listener (frontal incidence);
b. the sound field in the absence of the listener consists of a free progressive plane wave;
c. the sound pressure level is measured in the free progressive plane wave in the absence of the listener;
d. the listening is binaural;
e. the conditions of equal-loudness level are determined by the modal value of the judgements of an adequately large group of listeners;
f. the listeners are otologically normal persons in the age group from 18 to 30 years inclusive

The relations are expressed by means of an equation in bilinear form, with the sound pressure level as the independent variable and the loudness level as the dependent variable, for the preferred frequencies in the one-third octave series from 20 to 12 500 Hz inclusive.

ISO 362 (1994)

This International Standard specifies an engineering method for measuring the noise emitted by accelerating road vehicles.

The method is designed to meet the requirements of simplicity as far as they are consistent with reproducibility of results and realism under the operating conditions of the vehicle.

The specifications are intended to reproduce the noise levels in urban traffic of irregular character which requires the use of intermediate gears with full utilization of the engine power available.

The test method calls for an acoustical environment which can only be obtained in an extensive open space. Such conditions can usually be provided for:

- type approval measurements of vehicles
- measurements at the manufacturing stage, and
- measurements at official testing stations

It should be noted that spot checking of vehicles chosen at random can rarely be made in an ideal acoustical environment. If measurements have to be carried out on the road in an acoustical environment which does not fulfil the requirements stated in this International Standard, it should be recognized that the results obtained may deviate appreciably from the results obtained using the specified conditions.

EN ISO 389 (1991)

This International Standard specifies a standard reference zero for the scale of hearing threshold level applicable to pure-tone air conduction audiometers in order to promote agreement and uniformity in the expression of hearing threshold level measurements throughout the world.

It states the information in a form suitable for direct application to the calibration of audiometers, that is, in terms of the response of two standard models of earphones of models specified in 4.2 measured on an artificial ear complying with IEC 318.

It is based on an assessment of the information available from the various standardizing laboratories responsible for audiometric standards and from scientific publications. Some notes on the derivation and application of the recommended reference levels are given in annex A.

EN ISO 389-2 (1994)

This part of ISO 389 specifies reference equivalent threshold sound pressure levels (RETSPL) for the calibration of pure-tone audiometers supplementary to those specified in ISO 389:1991. Values given in this part of ISO 389 are applicable to insert earphones of a pattern specified in clause 4.

EN ISO 389-3 (1994)

This part of ISO 389 specifies the following data applicable to the calibration of bone vibrators for pure-tone bone-conduction audiometry.

a. Reference equivalent threshold force levels (RETFLs), corresponding to the threshold of hearing of young otologically normal persons by bone-conduction audiometry. RETFL is the vibratory force level transmitted to a mechanical coupler of specified characteristics by a vibrator when applied to the mechanical coupler under stated conditions of test and when energized at the voltage level corresponding to the normal threshold of hearing for location on the mastoid prominence.
b. Essential characteristics of the bone vibrator and of its method of coupling to a person under test and to the mechanical coupler
c. Essential characteristics and datum level of the masking noise applied to the ear not under test

Guidance on the practical application of this part of ISO 389 in the calibration of audiometers is given in annex B.

EN ISO 389-4 (1994)

This part of ISO 389 specifies reference levels for narrow-band masking noise presented by air conduction from an earphone in pure-tone audiometry. The data are given in terms of levels to be added to the reference equivalent threshold sound pressure levels for the corresponding pure-tone frequencies as specified in ISO 389:1991 or ISO 389-2, respectively, when the masking earphone is placed on the appropriate acoustic coupler, ear simulator or artificial ear.

Data are given for noise bandwidths of one-third and one-half octaves.

EN ISO 3740 (1980)

The most important factor in the selection of a noise measurement method is the ultimate use of the data that are to be obtained. This International Standard introduces a series of six International Standards describing various methods for determining the sound power levels of machines and equipment. Sound power level data are useful for:

a. calculating the approximate sound pressure level at a given distance from a machine operating in a specified environment;
b. comparing the noise radiated by machines of different types and sizes;
c. determining whether a machine complies with a specified upper limit of sound emission;
d. planning in order to determine the amount of transmission loss or noise control required under certain circumstances;
e. engineering work to assist in developing quiet machinery and equipment.

The sound power level data determined according to one of the basis International Standards are essentially independent of the environment in which the data are obtained. This is one of the reasons for using sound power level to characterize the noise emitted by various types of machines and equipment.

These basic standards specify the acoustical requirements for measurements appropriate for different test environments and accuracies.

When applying these basic standards to sound measurements on specific machines, it is necessary to decide which one of the basic standards is most appropriate for the particular class of machine or equipment and for the purpose of the test. It is also necessary to decide on specific details for mounting and operating the machine to be tested within the general principles states in the basic documents.

Guidelines for making these decisions are provided in this International Standard. These guidelines are essential for the proper application of the basic acoustical measurement standards and for the preparation of specific sound test codes for vaious types of machines and equipment.

If no specific sound test code exists for a particular type of machine, the most suitable of the basic documents should be followed and the mounting and operating conditions used should be described in the test report. These conditions should be in accordance with the general principles given in the basic documents.

EN ISO 3744 (1994)

This International Standard specifies a method for measuring the sound pressure levels on a measurement surface enveloping a noise source, under essentially free-field conditions near one or more reflecting planes, in order to calculate the sound power level produced by the noise source. It gives requirements for the test environment and instrumentation, as well as techniques for obtaining the surface

sound pressure level from which the sound power level of the source is calculated, leading to the results which have a grade 2 accuracy.

It is important that specific noise test codes for various types of equipment be established and used in accordance with the International Standard. For each type of equipment, such noise test codes will give detailed requirements on mounting, loading and operating conditions for the equipment under test as well as a selection of the measurement surface and the microphone array as specified in this International Standard.

EN ISO 3746 (1995)

This International Standard specifies a method for measuring the sound pressure levels on a measurement surface enveloping the source in order to calculate the sound power level produced by the noise source. It gives requirements for the test environment and instrumentation, as well as techniques for obtaining the surface sound pressure level from which the sound power level of the source is calculated, leading to the results which have a grade 3 accuracy.

It is important that specific noise test codes for various types of equipment be established and used in accordance with the International Standard. For each type of equipment, such noise test codes will give detailed requirements on mounting, loading and operating conditions for the equipment under test as well as a selection of the measurement surface and the microphone array as specified in this International Standard.

ISO 2923 (1975)

This International Standard specifies the conditions for obtaining reproducible and comparable measurements of the noise level and the noise spectrum on board vessels.

The results may be used, for example,

- to compare various vessels
- to characterize the acoustic comfort on board these vessels
- to orient a program of more elaborate measurements for the purposes of studying noise reduction procedures

ISO 4872 (1978)

This International Standard describes a method for measuring the noise emitted by construction equipment and machines intended for outdoor use. The method allows the determination of the acoustical characteristics of a sound source in terms of its a-weighted sound power level. The values obtained by this method are the fundamental quantities for characterizing the sound output. The results may be used for comparison with noise limits. In this case, the A-weighted sound power levels determined according to this International Standard are to be considered as guaranteed values which include all sources of measurement uncertainty.

The A-weighted sound power level of a device or machine is calculated from the measured values of the A-weighted sound pressure level at several microphone positions located on a hypothetical measurement surface which envelops the source. One of two alternative measurement surfaces may be selected:

- a hemispherical surface
- a rectangular parallepipedal surface

The method requires that the background noise be significantly lower than the noise produced by the source. Annex A gives procedures for qualifying the acoustic environment for the purpose of measurements made according to the requirements of this International Standard and for determining the magnitude of the environmental correction (if any).

Only the acoustical requirements for measurements in a free field over a reflecting plane are defined in this International Standard. The operating and mounting conditions of the device or machine are described in general terms. For specific types of machine, for example concrete mixers, compressors, earth-moving machinery, etc., reference should be made to special test codes which give detailed information on operating and mounting conditions and the array of microphone conditions to be selected from those given in this International Standard.

ISO 4871 (1996)

This International Standard

- prescribes a manner in which the noise emission of machinery and equipment shall be expressed for labelling purposes;
- prescribes the minimum information to be given in a label attached to a machine or in commercial or technical documents supplied to consumers by the manufacturer

This International Standard applies to machinery and equipment which is essentially stationary in nature. Traffic vehicles are excluded. It applies only to families of machines or equipment for which measurement test codes for the determination of the sound power level exists.

ISO 6394 (1998)

This International Standard describes a method for determining the noise emitted by earth-moving machinery at the operator's position in terms of the equivalent continuous A-weighted sound pressure level while the machine is in a stationary test condition.

This international Standard is applicable to the following specific types of earth-moving machinery: excavators (hydraulic or rope operated), crawlers and wheel tractors with dozer equipment, and crawlers and wheel loaders.

ISO 6393 (1998)

This International Standard describes a method for determining the exterior noise emitted by earth-moving machinery in terms of the A-weighted sound power level

while the machine is in a stationary test condition. At six positions on a hemispherical surface, the equivalent continuous A-weighted sound pressure levels are measured. The A-weighted sound power level of the machinery is calculated from the measured values.

This International Standard is applicable to the following specific types of earth-moving machinery: excavators (hydraulic or rope operated), crawlers and wheel tractors with dozer equipment, and crawlers and wheel loaders.

ISO 5128 (1980)

This International Standard is the first stage in the development of a test intended to provide a useful definition of interior noise for engineering and contractual purposes. It specifies the conditions for obtaining reproducible and comparable measurements of the levels of the noise and the noise spectra inside all kinds of motor vehicles intended for road use, including those where the driver and/or passengers occupy an open cabin or even only a well-defined area, but excluding agricultural tractors and field machinery covered by ISO 5131.

The results may be used, for example:

- to decide whether or not the noise inside is in accordance with noise specifications
- to estimate hearing damage risk in conjunction with noise exposure data (see ISO 1999)
- to rate the degree of speech interference
- to orient a programme of more elaborate measurements for the purposes of studying noise reduction procedures

The specified procedure is intended neither for the measurement of pressure oscillations at very low frequencies, nor for the assessment of the noise exposure for comfort and security such as fatigue and vigilance. The present state of the art does not yet allow a good correlation between measured data and comfort and security.

ISO 5129 (1987)

This International Standard specifies the instrumentation and procedures for obtaining reproducible and comparable measurements of the noise inside all kinds of aircraft.

The results may be used, for example,

- to determine compliance with maximum noise goals or specification requirements
- to assess the noise exposure for hearing conservation purposes
- to assess the degree of speech interference

ISO 7188 (1994)

This International Standard specifies a method for measuring the noise emitted by passenger cars (as defined in ISO 3833) in motion.

This method is based on statistical studies of the use of cars in urban driving. It is designed to meet the requirement of simplicity as far as that is consistent with reproducibility of results and realism en representing the operation conditions of the vehicle.

The specifications are intended to reproduce the noise level which is exceeded during only 5% of the total driving time in urban traffic flow of irregular character which requires the use of intermediate gears. The noise level obtained is in good correlation with the equivalent continuous A-weighted sound pressure level (see ISO 1996-1), $L_{Aeq,T}$, emitted by the vehicle during urban driving.

Information is also given, in notes, for the assessment of the noise level which is exceeded during only 1% of the total driving time.

The test method calls for an acoustical environment which can only be obtained in an extensive open space. Such conditions can usually be provided for:

- type approval measurements of vehicles
- measurements at the manufacturing stage, and
- measurements at official testing stations

It should be noted that spot checking of vehicles chosen at random can rarely be made in an ideal acoustical environment. If measurements have to be carried out on the road in an acoustical environment which does not fulfil the requirements stated in this International Standard, it should be recognized that the results obtained may deviate appreciably from those obtained under the specified conditions.

EN ISO 7235 (1991)

This International Standard Specifies the substitution method for determining the insertion loss of ducted silencers. It sets out requirements for determining

- the insertion loss, in frequency bands, of silencers with or without air flow
- the sound power level, in frequency bands, of the flow noise generated by silencers
- the total pressure loss of silencers with air flow

The measurement procedures are intended for laboratory measurements on silencers but may also be used for in situ measurements on silencers if the requirements of this International Standard can be met.

This International Standard applies to silencers for ventilating and air-conditioning systems which are usually connected to ducts or splitter absorbers mounted in ducts. Other duct elements, such as bends or T-connectors, may also be tested using this International Standard.

This International Standard does not apply reactive silencers used for motor vehicles.

EN ISO 9052-1 (1989)

This part of 9052 specifies the test method for determining the dynamic stiffness of resilient materials used under floating floors. Dynamic stiffness is one of the parameters that determine the sound insulation of such floors in dwellings.

This part of ISO 9052 applies to the determination of dynamic stiffness per unit area of resilient materials with smooth surfaces used in a continuous layer under floating floors in dwellings. It does not apply to loadings lower than 0,4 kPa, for example materials in wall linings, or greater than 4 kPa, for example materials under machinery foundations.

This part of ISO 9052 is mainly intended to be used for comparing production samples of similar materials of known specified quality.

For restrictions concerning the airflow resistivity of the resilient material to be tested, see 8.2.

EN ISO 9053 (1991)

This International Standard specifies two methods for the determination of the airflow resistance of porous materials for acoustical applications.

It is applicable to test specimens cut from products of porous materials.

EN ISO 10053 (1992)

This International Standard gives a method for measuring the sound attenuation of screens intended for use in rooms to increase speech privacy or noise insulation between working positions.

Screen sound attenuation measured according to this International Standard is intended to be used to classify screens.

Field conditions will, as a rule, deviate from the conditions specified in this method. Reflections from ceilings and walls can considerably lower the apparent screen sound attenuation.

The classification obtained to this International Standard is not valid in those practical situations where the source is situated close to the floor. The directivity of the actual sound source and the sound transmission properties of the screen produce results that differ from those obtained by use of the method given in this International Standard.

ISO 9611 (1996)

This International Standard specifies the essential acoustical performance requirements of reference sound sources.

It specifies procedures for calibrating a sound source intended for use as a reference sound source in terms of its sound power levels in octave and one-third octave bands and with frequency weighting A.

To achieve uniform and accurate results, this International Standard requires that the calibration be performed in the acoustic environment provided by a hemi-anechoic

room, i.e. a free field over a reflecting plane. The reference sound source operates on the reflecting plane and radiates sound into the free field above the plane.

It specifies the detailed procedures necessary to achieve the estimated calibration uncertainty.

This International Standard applies to a sound source which is manufactured for use as a reference sound source.

ISO 11691 (1995)

The International Standard specifies a laboratory substitution method to determine the insertion loss without flow of ducted, mainly absorbent, circular and rectangular silencers, as well as other duct elements for use in ventilating and air-conditioning systems.

Laboratory measurements procedures for ducted silencers with superimposed flow are described in ISO 7235.

This International Standard is applicable to silencers where the design velocity does not exceed 15m/s. As the method does not include self-generated flow noise, this International Standard is not suitable for tests in silencers where this type of noise is of great importance for the evaluation of the silencer performance.

The insertion loss determined according to this International Standard in a laboratory will not necessarily be the same as the insertion loss that will be obtained in an installation in the field. Different sound and flow fields in the duct will yield different results. As this International Standard requires regular test ducts, the results may include some flanking transmission via structural vibrations in the duct walls, that sets an upper limit to the insertion loss can be determined.

ISO 7235 gives methods for determining this limit.

This International Standard is intended to be used for circular silencers with diameters of 80 mm to 2000 mm or rectangular silencers with cross-sectional areas within the same range.

ISO 10844 (1997)

This International Standard specifies the materials, design, construction and properties of a test surface in order to minimize intersite variation in vehicle noise measurements.

In particular, the surface design given in this International Standard will

- produce relatively low levels of tyre/road noise under a wide range of operating conditions including those appropriate to vehicle noise testing
- provide negligible absorption of noise from the vehicle's power unit and related sources
- be consistent with general road building-practice

Although this International Standard has been developed particularly for use with the ISO 362 and ISO 7188 test procedures, it can be used for vehicle noise testing generally where it is desirable to achieve a low level of tyre/road noise during the test.

This International Standard does not take into account the influence on tyre/road noise of purely tyre-related parameters such as tyre construction, tread pattern, inflation pressure and tyre loading. It follows that since the surface is not intended to produce significant tyre/road noise levels, it is not particularly designed for the testing and comparison of tyre/road noise.

NEN 5077 (2001)

This standard gives determination methods for the quantities for: airborne sound insulation between rooms in buildings; - impact sound insulation between rooms in buildings; -sound proofing of internal and external partitions; - sound levels caused by technical services

NEN 5078 (1990)

This standard gives a calculation method to determine in octave bands the sound absorption in spaces of domestic facilities and other buildings. The method is also applicable to the determination in octave bands of the sound absorption of parts individual enclosures.

NEN 5079 (1999)

This standard shows how to represent the sound insulation of building elements, measured in the laboratory, in a single number. This standard treats two quantities with which the insulation of airborne sound can be described in a single number: I<(inf)lu>, the laboratory insulation index for all building elements and R<(inf)A>, the A-weighted airborne sound insulation for specific facade elements. With respect to impact sound insulation this standard treats a single quantity: I<(inf)co,lab>, the laboratory insulation index for impact sound. The standard applies to building elements and constructions of which the sound insulation has been determined in the laboratory by measurements in accordance with enquiry NEN 1070:1997.

ISO 11957 (1996)

This standard specifies a laboratory method and in situ methods for the determination of the sound insulation performance of sound-protecting cabins. The sound insulation performance is the reduction in sound pressure level or sound power level afforded by the cabin. The methods are applicable to cabins with a small leak ratio. This standard is applicable to a complete cabin only and not to the individual components from which it is made. Requirements for the test environment in the laboratory are based on those given in ISO 3741.

EN ISO 6926 (1999)

This International Standard specifies the acoustical performance requirements for reference sound sources:

- temporal steadiness and repeatability of the sound power output
- spectral characteristics
- directivity index

ISO 9611 (1996)

Specifies an approximate method of characterizing sources of structure-borne sound by the measurement of one-third-octave-band free velocity level spectra (or, if appropriate, octave-band velocity level spectra) on the supports or other connection points of machines mounted on resilient isolators. This structure-borne sound emission is considered with respect to the airborne or liquid-borne sound radiation of structures connected to the source under test. The results are only valid for applications in which the machine is mounted on sufficiently soft isolators on a sufficiently stiff and heavy foundation.

ISO 10286 (1996)

Specifies operational procedures for avoidance of neck and shoulder cracks in aluminium alloy cylinders having water capacities from 0,5 l to 150 l.

EN ISO 14163 (1998)

Deals with the practical selection of silencers for noise control in gaseous media. It specifies the acoustical and operational requirements which are to be agreed upon between the supplier or manufacturer and the user of a silencer. The basic principles of operation are described in this standard, but is not a silencer design guide. The silencers described are suitable, among other, - for attenuating system noise and preventing crosstalk in heating, ventilation and air-conditioning (HVAC) equipment; - for preventing or reducing sound transmission through ventilation openings from rooms with high inside sound levels; - for attenuating intake and exhaust noise generated by internal combustion engines, and - for attenuating intake and outlet noise from fans, compressors and turbines. They are classified according to their types, performance characteristics and applications. Active noise-control systems are not covered in detail in this standard.

EN ISO 11820 (1996)

This standard specifies silencer measurements in situ. It is applicable to measurements on silencers in practical applications for acoustic analysis, acceptance tests and similar evaluations. Results obtained in accordance with this International Standard cannot be compared to performance data obtained from laboratory measurements on ducted silencers in accordance with ISO 7235, partly because of different test conditions (such as sound field distribution, flow, temperature and mounting conditions) and partly because of different definitions.

EN ISO 11821 (1997)

This standard specifies methods for evaluating the in situ sound attenuation performance of a removable screen, either indoors our outdoors. This engineering

grade method is based on an insertion loss measurement that can be carried out either with shielding of the actual sound source(s) or using an artificial sound source.

NEN 29296 (1988)

This International Standard applies to computer and business equipment. This International Standard specifies - the method for determining the declared noise emission values; - acoustical and product information to be given in technical documents supplied to users by the manufacturer; - the method for verifying the declared noise emission values given by the manufacturers.

EN ISO 11200 (1995)

Provides brief summaries of the basic Standards for determining emission sound pressure levels from all-types of machinery and equipment, at work stations and other specified positions, and gives guidance on the process of selection of which is appropriate to any particular type. The guidance given applies only to airborne sound, and is for use in the preparation of noise test codes, and also for use in noise testing where no noise test code exists. It is important that specific noise test codes for various types of machinery and equipment be established and used in accordance with the requirements of these basic standards. Such standardized noise test codes will give detailed requirements on mounting and operating conditions for the particular family to which the machine under test belongs, as well as the location of the work station(s) and other specified positions as prescribed in these standards. The data so obtained may also be used for the declaration and verification of emission sound pressure levels as specified in ISO 4871.

EN ISO 11201 (1995)

This standard prescribes a method for measuring the emission sound pressure levels of machinery and equipment, at work stations and other specified positions nearby, in an essentially free field over a reflecting plane. A work station is occupied by an operator; it may be located in open space in the room where the source operates or in a cab fixed to the source, or in an enclosure remote from the source. One or more specified positions may be located in the vicinity of a work station, or in the vicinity of an unattended machine. As some of these positions may be occupied occasionally or regularly, they are sometimes referred to as bystander positions. This standard is applicable to all types of machines, both moving and stationary, for indoor or outdoor use.

EN ISO 12001 (1996)

This standard specifies the technical requirements of a noise code for a specific family of machinery or equipment. It is applicable to stationary machinery and equipment including hand-held tools, as well as those that present hazards due to mobility or load lifting. The purpose of a noise test code is to permit comparable test results to be obtained on the noise emissions of machines from the same family, thus enabling users to make comparisons and to check the declared noise emission data. The quantities described in a noise test code are also useful for noise specifications in private contracts, for planning and for noise reduction purposes.

EN ISO 9295 (1998)

This Standard specifies four methods for the determination of the sound power levels of high-frequency noise emitted by computer and business equipment in the frequency range covered by the octave band centred at 16 kHz. They are complementary to the methods described in ISO 7779.The first three methods are based on the reverberation room technique described in clause 5 of ISO 7779:1988. The fourth method makes use of a free field over a reflecting plane as described in clause 6 of ISO 7779:1988.

NEN 1087 (2001)

Gives determination methods for buildings for a) the rated ventilation capacity of a supply for ventilation (supply for fresh air and the transport of indoor air; b) the installation of a ventilation supply with regard to thermal comfort, the direction of the air flow, the controllability of the supply of fresh air.

ISO 10302 (1996)

Specifies a method for measuring the airborne noise emitted by small air moving devices such as those used for cooling electronic, electrical and mechanical equipment. These air moving devices include such types as propeller fans, tube-axial fans, vane-axial fans, centrifugal blowers, transverse blowers, cabinet blowers and variations of these types.