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Interested committees:

Title: Draft BS EN 1793-6 Road traffic noise reducing devices - Test method for determining the acoustic performance. Part 6: Intrinsic characteristics. In situ values of airborne sound insulation under direct sound field conditions.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

CEN/TC 226

Date: 2023-03-31

prEN 1793-6:2023

Secretariat: AFNOR

Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 6: Intrinsic characteristics - Airborne sound insulation under direct sound field conditions

Lärmschutzvorrichtungen an Straßen — Prüfverfahren zur Bestimmung der akustischen Eigenschaften — Teil 6: Produktspezifische Merkmale — Luftschalldämmung in gerichteten Schallfeldern

Dispositifs de réduction du bruit du trafic routier — Méthode d'essai pour la détermination de la performance acoustique — Partie 6 : Caractéristiques intrinsèques — Isolation au bruit aérien dans des conditions de champ acoustique direct

CCMC will prepare and attach the official title page.

Contents

Page

European foreword	4
Introduction	5
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	7
4 Symbols and abbreviations	13
5 Sound insulation index measurements	15
5.1 General principle	15
5.2 Measured quantity	15
5.3 Test arrangement	16
5.3.1 General.....	16
5.3.2 Tests on purposely built full-size samples	16
5.3.3 Tests on installed road traffic noise reducing devices.....	16
5.3.4 Non-flat, inclined or curved road traffic noise reducing devices	17
5.4 Measuring equipment	23
5.4.1 Components of the measuring system	23
5.4.2 Sound source	23
5.4.3 Test signal.....	23
5.5 Data processing	24
5.5.1 Calibration.....	24
5.5.2 Sample rate and filtering.....	24
5.5.3 Background noise	25
5.5.4 Scanning technique using nine microphones.....	26
5.5.5 Adrienne temporal window	26
5.5.6 Placement of the Adrienne temporal window.....	28
5.5.7 Low-frequency limit.....	29
5.6 Positioning of the measuring equipment.....	30
5.6.1 Selection of the measurement positions	30
5.6.2 Post measurements.....	31
5.6.3 Additional measurements	31
5.6.4 Reflecting objects.....	31
5.6.5 Safety considerations	31
5.7 Sample surface and meteorological conditions.....	32
5.7.1 Condition of the sample surface	32
5.7.2 Wind.....	32
5.7.3 Air temperature.....	32
5.8 Single-number rating	32
5.8.1 General.....	32
5.8.2 Acoustic elements.....	32
5.8.3 Posts.....	33
5.8.4 Global	33
6 Measurement uncertainty	34
7 Measuring procedure	34

8	Test report	35
	Annex A (informative) Low-frequency limit and window width.....	37
	Annex B (informative) Measurement uncertainty.....	42
B.1	General	42
B.2	Measurement uncertainty based upon reproducibility data	42
B.3	Standard deviation of repeatability and reproducibility of the sound insulation index.....	42
	Annex C (normative) Template of test report on airborne sound insulation of road traffic noise reducing devices.....	45
C.1	General	45
C.2	Test setup (example).....	47
C.3	Test object and test situation (example)	49
C.4	Results (example).....	51
C.4.1	Part 1 – Results for ‘element’ in tabular form	51
C.4.2	Part 2 – Results for ‘element’ in graphic form.....	52
C.4.3	Part 3 – Results for ‘post’ in tabular form.....	53
C.4.4	Part 4 – Results for ‘post’ in graphic form	54
C.4.5	Part 5 – Results for global condition (average of ‘element’ and ‘post’) in tabular form	55
C.4.6	Part 6 – Results for global condition (average of ‘element’ and ‘post’) in graphic form.....	56
C.5	Uncertainty (example).....	56
	Annex D (informative) Indoor measurements for product qualification.....	59
D.1	General	59
D.2	Parasitic reflections.....	59
D.3	Reverberation time of the room.....	59
	Bibliography	60

European foreword

This document (prEN 1793-6:2023) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1793-6:2018+A1:2021.

EN 1793-6:2023 includes the following significant technical changes with respect to EN 1793-6:2018+A1:2021:

- The definitions from 3.1 to 3.8 have been updated to be in accordance to the last version of EN 14388.
- The scanning technique is based on a nine-microphone grid; the use of a single microphone displaced in nine positions has been abandoned.
- The formula to calculate the global single-number rating $DL_{SL,G}$ used in the previous version of this document has been changed.
- The use of categories of single-number rating is no longer permitted.
- One value for the standard deviation of reproducibility and repeatability in each one-third octave frequency band has been retained, in place of three values (min, max and median) as before (see Tables B.1 and B.2).
- The example in C.5 on the declaration of the measurement uncertainty has been updated accordingly.

EN 1793-6:2023 is part of a series and should be read in conjunction with the following:

- EN 1793-1:2023, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 1: Intrinsic characteristics — Sound absorption under diffuse sound field conditions*;
- EN 1793-2:2023, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 2: Intrinsic characteristics — Airborne sound insulation under diffuse sound field conditions*;
- EN 1793 3:2023, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 3: Normalized traffic noise spectrum*;
- EN 1793-4:2023, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 4: Intrinsic characteristics — Intrinsic sound diffraction*;
- EN 1793-5:2023, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 5: Intrinsic characteristics — Sound absorption under direct sound field conditions*;

Introduction

Noise reducing devices alongside roads should provide adequate sound insulation so that sound transmitted through the device is not significant compared with the sound diffracted over the top. This document specifies a test method for assessing the intrinsic airborne sound insulation performance for noise reducing devices designed for roads in non-reverberant conditions. It can be applied indoors or outdoors. Indoors, it can be applied in a purposely built test facilities, e.g., inside a laboratory. Outdoors, it can be applied in a purposely built test facilities, e.g., near a laboratory or a factory, as well as *in situ*, i.e., where the road traffic noise reducing devices are installed. The method can be applied without damaging the surface of the road traffic noise reducing device.

The method can be used to qualify products to be installed along roads as well as to verify the compliance of installed road traffic noise reducing devices to design specifications. Regular application of the method can be used to verify the long-term performance of road traffic noise reducing devices.

The method requires the averaging of results of measurements taken at different points behind the device under test. The method is able to investigate flat and non-flat products.

The method uses the same principles and equipment for measuring sound reflection (see EN 1793-5:2023) and airborne sound insulation (the present document).

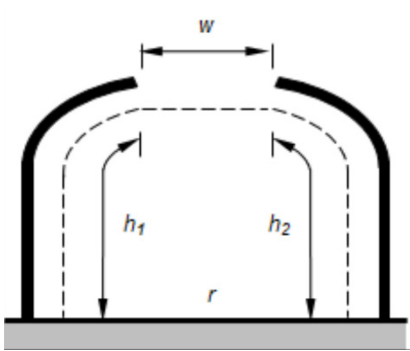
The measurement results of this method for airborne sound insulation are comparable but not identical with the results of EN 1793-2:2023 method, mainly because the present method uses a directional sound field, while EN 1793-2:2023 method assumes a diffuse sound field (where all angles of incidence are equally probable). Research studies suggest that good correlation exists between laboratory data, measured according to EN 1793-2:2023 and field data, measured according to the method described in the present document [4-9].

The test method described in this Document should not be used to determine the intrinsic characteristics of airborne sound insulation for road traffic noise reducing devices to be installed in reverberant conditions, e.g., inside tunnels or deep trenches or under covers.

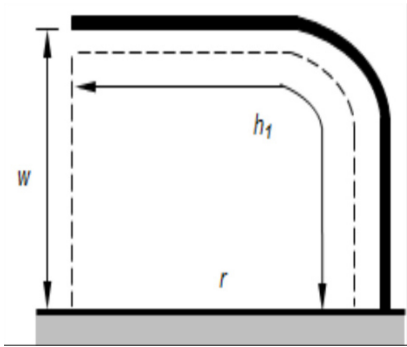
For the purpose of this document, reverberant conditions are defined based on the geometric envelope, e , across the road formed by the barriers, trench sides or buildings (the envelope does not include the road surface) as shown by the dashed lines in Figure 1. Conditions are defined as being reverberant when the percentage of open space in the envelope is less than or equal to 25 %, i.e., reverberant conditions occur when $w/e \leq 0,25$, where $e = (w+h_1+h_2)$.

This document introduces a specific quantity, called sound insulation index, to define the airborne sound insulation of a road traffic noise reducing device. This quantity should not be confused with the sound reduction index used in building acoustics, sometimes also called transmission loss.

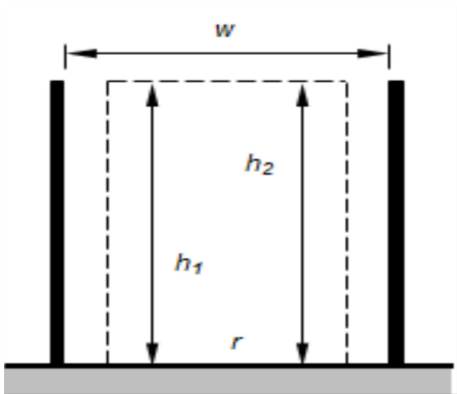
This method can be used to qualify noise reducing devices for other applications, e.g., to be installed nearby industrial sites. In this case, the single-number ratings can preferably be calculated using an appropriate spectrum.



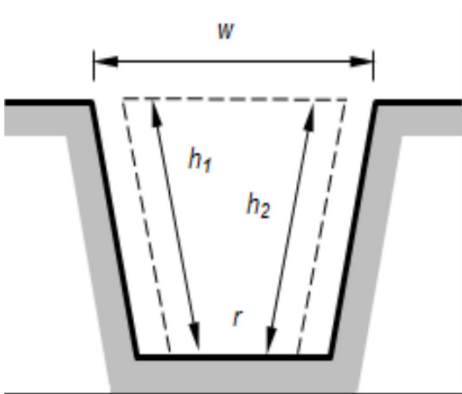
a) Partial cover on both sides of the road;
envelope, $e = w+h_1+h_2$



b) Partial cover on one side of the road;
envelope, $e = w+h_1, h_2 = 0$



c) Deep trench;
envelope, $e = w+h_1+h_2$



d) Tall barriers or buildings;
envelope, $e = w+h_1+h_2$

Key

- r road surface
- w width of open space
- h_1 Developed length of element, e.g. cover, trench side, barrier or building
- h_2 Developed length of element, e.g. cover, trench side, barrier or building

NOTE Figure 1 is not to scale.

Figure 1 — Sketch of the reverberant condition check in four cases

1 Scope

This document describes a test method for measuring a quantity representative of the intrinsic characteristics of airborne sound insulation for road traffic noise reducing devices: the sound insulation index.

The test method is intended for the following applications:

- determination of the intrinsic characteristics of airborne sound insulation of noise reducing devices to be installed along roads, to be measured either on typical installations alongside roads or in laboratory conditions;
- determination of the intrinsic characteristics of airborne sound insulation of road traffic noise reducing devices in actual use;
- comparison of design specifications with actual performance data after the completion of the construction work;
- verification of the long-term performance of road traffic noise reducing devices (with a repeated application of the method);
- interactive design process of new products, including the formulation of installation manuals.

The test method is not intended for the determination of the intrinsic characteristics of airborne sound insulation of road traffic noise reducing devices to be installed in reverberant conditions, e.g., inside tunnels or deep trenches or under covers.

Results are expressed as a function of frequency in one-third octave bands, where possible, between 100 Hz and 5 kHz. If it is not possible to get valid measurement results over the whole frequency range indicated, the results need to be given in a restricted frequency range and the reasons for the restriction(s) need to be clearly reported.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1793-3:2023, *Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 3: Normalized traffic noise spectrum*

EN 14389:2023, *Road traffic noise reducing devices - Procedures for determining long-term performance*

EN 61672-1:2013, *Electroacoustics — Sound level meters — Part 1: Specifications (IEC 61672-1)*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>

— IEC Electropedia: available at <https://www.electropedia.org/>

3.1

road traffic noise reducing device

RTNRD

device designed to reduce the propagation of traffic noise away from the road environment

Note 1 to entry: An RTNRD can comprise acoustic elements (3.2) only or both structural (3.3) and acoustic elements.

Note 2 to entry: Applications of RTNRDs include noise barriers (3.6), claddings (3.6), covers (3.7) and added devices (3.8).

3.2

acoustic element

element whose primary function is to provide the acoustic performance of the device

3.3

structural element

element whose primary function is to support or hold in place the parts of the RTNRD

3.4

self-supporting acoustic element

acoustic element including its own structural element to support itself

3.5

noise barrier

road traffic noise reducing device which obstructs the direct transmission of airborne sound emanating from road traffic

3.6

cladding

road traffic noise reducing device which is attached to a wall or other structure and reduces the amount of sound reflected

3.7

cover

road traffic noise reducing device which either spans or overhangs the road

3.8

added device

additional component that influences the acoustic performance of the original road traffic noise reducing device

Note 1 to entry: The added device is acting primarily on the diffracted energy.

3.9

sound insulation index

quantity representing the amount of sound transmitted through the device under test

Note 1 to entry: Formula (1) specifies how to calculate the sound insulation index

Note 2 to entry: The sound insulation index values in one-third octave bands are the result of a test according to the present document

3.10**reference height**

height h_S equal to half the height, h_B , of the road traffic noise reducing device under test: $h_S = h_B/2$

Note 1 to entry: See Figures 2, 4, 6, 7 and 8

Note 2 to entry: When the height of the device under test is greater than 4 m and, for practical reasons, it is not advisable to have a height of the source $h_S = h_B/2$, it is possible to have $h_S = 2$ m, accepting the corresponding low frequency limitation (see 5.5.7).

3.11**source reference surface for sound insulation index measurements**

ideal, smooth surface facing the sound source side of the road traffic noise reducing device under test and just touching the most protruding and significant parts of it within the tested area

Note 1 to entry: The reference surface is as smooth as possible, and follows the inclination or curve of the device under test within the tested area. For vertical and flat road traffic noise reducing devices, the reference surface is a vertical plane. For inclined and flat road traffic noise reducing devices, the reference surface is a plane with the same inclination. For curve and flat road traffic noise reducing devices, the reference surface is a curve surface with the same curvature.

Note 2 to entry: See Figures 2, 7 and 8.

3.12**microphone reference surface**

ideal, smooth surface facing the receiver side of the road traffic noise reducing device under test and just touching the most protruding and significant parts of it within the tested area

Note 1 to entry: The reference surface is as smooth as possible, and follows the inclination or curve of the device under test within the tested area. For vertical and flat road traffic noise reducing devices, the reference surface is a vertical plane. For inclined and flat road traffic noise reducing devices, the reference surface is a plane with the same inclination. For curve and flat road traffic noise reducing devices, the reference surface is a curve surface with the same curvature.

Note 2 to entry: See Figures 2, 7 and 8.

3.13**source reference position**

position facing the side to be exposed to noise when the device is in place, located at the reference height h_S and placed so that its horizontal distance to the source reference surface is $d_S = 1$ m

Note 1 to entry: See Figures 2, 4, 6, 7 and 8

Note 2 to entry: The actual dimensions of the loudspeaker used for the background research on which this document is based are: 0,40 m x 0,285 m x 0,285 m (length x width x height).

3.14

measurement grid for sound insulation index measurements

measurement grid constituted of nine equally spaced microphones in a 3x3 squared configuration

Note 1 to entry: The orthogonal spacing between two subsequent microphones, either vertically or horizontally, is $s = 0,40$ m.

Note 2 to entry: See Figures 2, 3, 4, 6, 7, 8 and 4.5.4.

3.15

measurement grid reference position

position facing the receiver side of the device under test, located at the reference height h_S and placed so that its horizontal distance to the microphone reference surface is $d_M = 0,25$ m

Note 1 to entry: See Figures 2, 6, 7 and 8

3.16

barrier thickness for sound insulation index measurements

distance t_B between the source reference surface and the microphone reference surface at a height equal to the reference height h_S

Note 1 to entry: See Figures 2, 6, 7 and 8

3.17

free-field measurement for sound insulation index measurements

measurement taken with the loudspeaker and the microphone in an acoustic free field in order to avoid reflections from any nearby object, including the ground, keeping the same geometry as when measuring across the noise reducing device under test (see Figure 6)

3.18

Adrienne temporal window

Analysis window in the time domain to be used for the data processing

Note 1 to entry: Processing in accordance with this document

Note 1 to entry: The Adrienne temporal window is described in 5.5.5

3.19

background noise

noise coming from sources other than the source emitting the test signal

3.20

signal-to-noise ratio, S/N

difference in decibels between the level of the test signal and the level of the background noise at the moment of detection of the test signal (within the Adrienne temporal window)

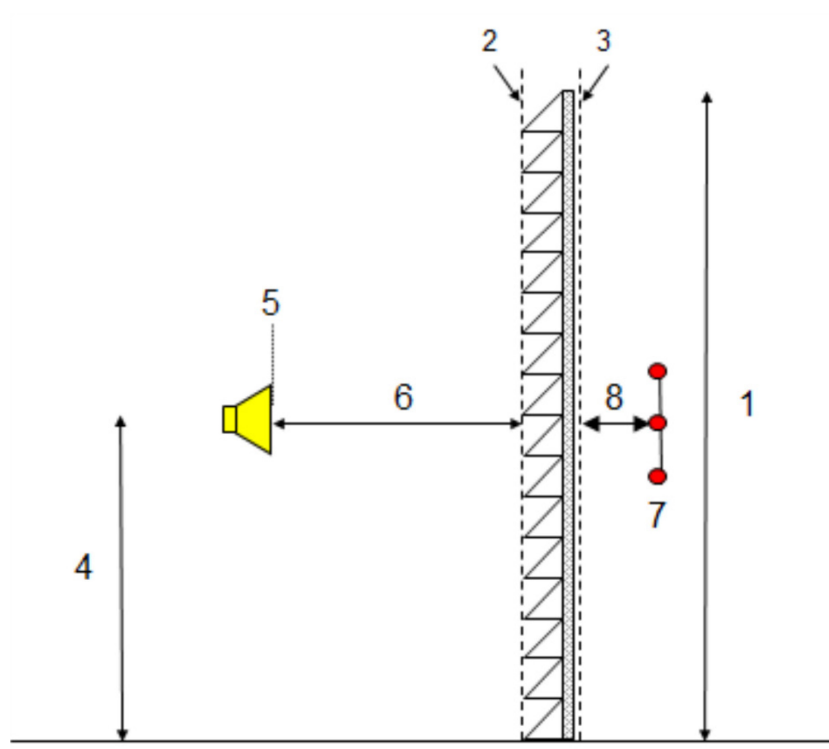
3.21

impulse response

time signal at the output of a system when a Dirac function is applied to the input

Note 1 to entry: The Dirac function, also called δ function, is the mathematical idealisation of a signal that is infinitely short in time which carries a unit amount of energy.

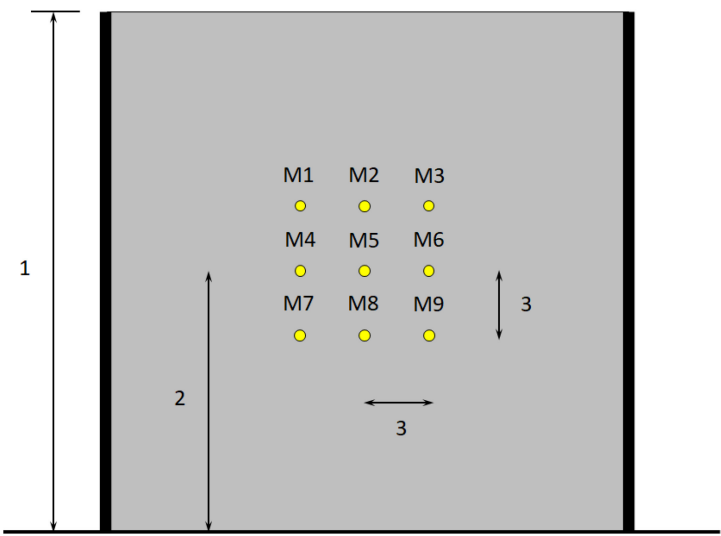
Note 2 to entry: It is impossible in practice to create and radiate true Dirac delta functions. Short transient sounds can offer close enough approximations but are not very repeatable. An alternative measurement technique, generally more accurate, is to use a period of deterministic, flat-spectrum signal, like maximum-length sequence (MLS) or exponential sine sweep (ESS), and transform the measured response back to an impulse response.



Key

- | | | | |
|---|--|---|--|
| 1 | road traffic noise reducing device height, h_B [m] | 5 | loudspeaker front panel |
| 2 | source reference surface | 6 | distance between the loudspeaker front panel and source reference surface, d_S [m] |
| 3 | microphone reference surface | 7 | microphone grid |
| 4 | reference height, h_s [m] | 8 | distance between the microphone grid and the microphone reference surface [m] |

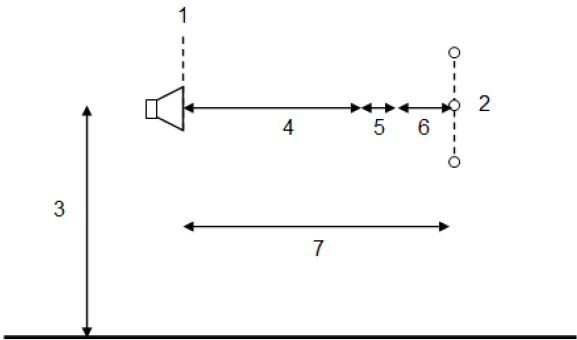
Figure 2 — Sketch of the loudspeaker and the microphone grid close to the road traffic noise reducing device under test for sound insulation index measurements (not to scale)



Key

- | | |
|---|---|
| 1 Road traffic noise reducing device height h_B [m] | 3 Orthogonal spacing between two subsequent microphones s [m] |
| 2 Reference height h_S [m] | |

Figure 3 — (not to scale) Measurement grid for sound insulation index measurements in front of the device under test (receiver side); the yellow circles indicate the microphone positions, labelled from M1 to M9



Key

- | | |
|--|---|
| 1 loudspeaker front panel | 5 Road traffic noise reducing device thickness t_B at height h_S [m] |
| 2 measurement grid | 6 horizontal distance microphone 5 - microphone reference surface d_M at height h_S [m] |
| 3 reference height h_S [m] | 7 Horizontal distance loudspeaker - microphone 5 d_T at height h_S [m] |
| 4 horizontal distance loudspeaker - source reference surface d_S at height h_S [m] | |

Note: $d_T = d_S + t_B + d_M$; see Formula (5).

Figure 4 — (not to scale) Sketch of the set-up for the reference “free-field” sound measurement for the determination of the sound insulation index

4 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

Table 1 – Symbols and abbreviations

Symbol or abbreviation	Designation	Unit
a	major axis of the ellipsoid of revolution used to define the maximum sampled area at oblique incidence	m
a_0, a_1, a_2, a_3	Coefficient for the expression of the four-term full Blackman-Harris window	-
b_S	Depth of the surface structure of the sample under test	m
b_m	Width of a portion of material of the sample under test	m
c	Speed of sound in air	m/s
d_M	Horizontal distance from the microphone reference surface to the measurement grid; it is equal to $d_M = 0,25$ m	m
d_S	Horizontal distance from the front panel of the loudspeaker to the sound source reference surface; it is equal to: $d_S = 1$ m	m
d_T	Horizontal distance from the front panel of the loudspeaker to the measurement grid; it is equal to: $d_S + t_B + d_M$	m
DL_{SI}	Single number rating of sound reflection	dB
δ_i	Any input quantity to allow for uncertainty estimates	-
Δf_j	Width of the j -th one-third octave frequency band	Hz
F	Symbol of the Fourier transform	-
f	Frequency	Hz
f_{min}	Low frequency limit of sound reflection index measurements	Hz
f_S	Sample rate	Hz
f_{co}	cut-off frequency of the anti-aliasing filter	Hz
h_B	Noise reducing device height	m
h_S	Reference height	m
$h_{i,k}(t)$	Incident reference component of the free-field impulse response at the k -th measurement point	-
$h_{t,k}(t)$	Transmitted component of the impulse response at the k -th measurement point	-
$h_{n,k}(t)$	Background noise component of the impulse response at the k -th measurement point;	-
j	Index of the j -th one-third octave frequency band (between 100 Hz and 5 kHz, where possible)	-

Symbol or abbreviation	Designation	Unit
k	Index of the k -th measurement point ($k = 1 \dots n$)	-
k_p	Coverage factor	-
k_f	Constant used for the anti-aliasing filter	-
L_E	Length of an acoustical element	m
L_p	Sample period length of a non-homogeneous noise reducing device	m
n	Number of measurement points on which to average ($n = 9$)	-
r	Radius of the maximum sampled area at normal incidence	m
SI_j	Sound transmission index in the j -th one-third octave frequency band	-
s	Orthogonal spacing between two subsequent microphones	m
s_r	Standard deviation of repeatability	-
s_R	Standard deviation of reproducibility	-
S/N	Signal to noise ratio	dB
$S_{R,DL_{SI,E}}$	Standard deviation of reproducibility of the single-number rating for "elements"	-
$S_{R,DL_{SI,P}}$	Standard deviation of reproducibility of the single-number rating for "posts"	-
$S_{R,DL_{SI,G}}$	Standard deviation of reproducibility of the single-number rating for "global"	-
S/N_k	Signal-to-noise-ratio at the k -th microphone	dB
$S/N_{j,k}$	Signal-to-noise-ratio at the k -th microphone in the j -th one-third frequency band	dB
t	Time	s
t_B	Thickness of the noise reducing device under test at the height h_S	m
t_C	Air temperature	°C
$T_{W,BH}$	Length of the Blackman-Harris trailing edge of the Adrienne temporal window	s
$T_{W,ADR}$	Total length of the Adrienne temporal window	s
u	Standard uncertainty	-
U	Expanded uncertainty	-
$w_{i,k}(t)$	Reference free-field component time window (Adrienne temporal window) at the k -th measurement point	-
$w_{r,k}(t)$	Time window (Adrienne temporal window) for the reflected component at the k -th measurement point	-

5 Sound insulation index measurements

5.1 General principle

The sound source emits a transient sound wave that travels toward the device under test and is partly reflected, partly transmitted and partly diffracted by it. The microphone placed on the other side of the device under test receives both the transmitted sound pressure wave travelling from the sound source through the device under test, and the sound pressure wave diffracted by the top edge of the device under test (for the test to be meaningful the diffraction from the lateral edges should be sufficiently delayed). If the measurement is repeated without the device under test between the loudspeaker and the microphone, the direct free-field wave can be acquired. The power spectra of the direct wave and the transmitted wave give the basis for calculating the sound insulation index.

The sound insulation index shall be the logarithmic average of the values measured at nine points placed on the measurement grid (scanning points). See Figure 3 and Formula (1).

The measurement shall take place in a sound field free from reflections within the Adrienne temporal window. For this reason, the acquisition of an impulse response having peaks as sharp as possible is recommended: in this way, the reflections coming from other surfaces can be identified from their delay time and rejected.

5.2 Measured quantity

The expression used to compute the sound insulation index SI as a function of frequency, in one-third octave bands, is:

$$SI_j = -10 \cdot \lg \left\{ \frac{1}{n} \sum_{k=1}^n \frac{\int_{\Delta f_j} |F[h_{t,k}(t)w_{tk}(t)]|^2 df}{\int_{\Delta f_j} |F[h_{i,k}(t)w_{ik}(t)]|^2 df} \right\} \quad (1)$$

where

- $h_{i,k}(t)$ is the incident reference component of the free-field impulse response at the k_{th} scanning point;
- $h_{t,k}(t)$ is the transmitted component of the impulse response at the k_{th} scanning point;
- $w_{i,k}(t)$ is the time window (Adrienne temporal window) for the incident reference component of the free-field impulse response at the k_{th} scanning point;
- $w_{t,k}(t)$ is the time window (Adrienne temporal window) for the transmitted component at the k_{th} scanning point;
- F is the symbol of the Fourier transform;
- j is the index of the j^{th} one-third octave frequency band (between 100 Hz and 5 kHz, where possible);
- Δf_j is the width of the j^{th} one-third octave frequency band;
- $n = 9$ is the number of scanning points.

5.3 Test arrangement

5.3.1 General

The test method can be applied either on road traffic noise reducing devices installed alongside roads or on real-size samples purposely assembled to be tested (indoors or outdoors) using the method described here.

5.3.2 Tests on purposely built full-size samples

For applications on full-size samples purposely built to be tested using the method described here, e.g. in an outdoor test facility, the specimen shall be built as follows (see Figure 5):

- a part, composed of acoustic elements, that extends at least 4 m and is at least 4 m high;
- a post 4 m high (if applicable for the specific noise reducing device under test).
- a part, composed of acoustic elements, that extends at least 2 m and is at least 4 m high;

The test specimen shall be mounted and assembled in the same manner as the manufactured device is used in practice with the same connections and seals between components parts.

The tested area is a circle having a radius of 2 m centred on the middle of the measurement grid. The sample shall be built large enough to completely include this circle for each measurement.

For qualifying the sound insulation index across posts only, it is only necessary to have acoustic elements that extend 2 m or more on either side of the post (see Figure 5).

If the device under test has a post-to-post distance less than 4 m, the distance between posts should be reduced accordingly but the overall minimum width of the construction should be the same as shown in Figure 5.

5.3.3 Tests on installed road traffic noise reducing devices

For applications on noise reducing devices that are already installed along roads, the test specimen shall be constructed as follows:

- *for installed noise reducing devices using single acoustic elements to achieve full height:*
 - the test specimen shall be constructed as a single element which is representative of the specific application;
 - where the test specimen cannot be constructed as a single element or where the installed road traffic noise reducing device is lower than 4 m, the test specimen shall be centred on the loudspeaker axis (at reference height $h_S = 2$ m above the ground) and built up to 4 m high using smaller height acoustic elements at the base and top as appropriate;
- *for installed road traffic noise reducing devices using stacked elements to achieve full height:*
 - the test specimen shall be constructed as used in the specific application.

For applications on road traffic noise reducing devices that are already installed along roads, if there is a plinth under the road traffic noise reducing device, it shall be considered part of the “sample under test”.

5.3.4 Non-flat, inclined or curved road traffic noise reducing devices

For flat or curved, vertical or inclined road traffic noise reducing devices, Figures 7 and 8 apply. For cases not covered by these figures, measurements should be carried out in accordance with the following general principles:

- the plane of the microphone grid is parallel to the microphone reference surface;
- the axis loudspeaker-microphone 5 is horizontal and directed toward the sound source reference surface;
- microphone 5 is as close as possible to the mid-height of the screen;
- the shortest distance of microphone 5 to the microphone reference surface is $d_M = 0,25$ m.

Road traffic noise reducing devices consisting of a horizontal or vertical juxtaposition of several distinct types of screens (composition of shapes or structures of very large dimensions) must be characterised in detail: each shape or structure must be specifically characterised under the conditions described in this document.

For structures that do not allow the unequivocal application of these rules, measurements may be carried out in strict compliance with the provisions of this Document. The responsibility for adapting the method is left to the operator. A clear justification of all choices made shall be included in the test report. However, the results obtained under these conditions may in no case be used for the declaration of performance.