SLOVENSKI STANDARD
oSIST prEN 1793-2:2023

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Nadomešča:
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Protihrupne ovire za cestni promet - Preskusna metoda za ugotavljanje akustičnih lastnosti - 2. del: Karakteristike, značilne za izolacijo pred zvokom v zraku pri razpršenem zvočnem polju

Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 2: Intrinsic characteristics of airborne sound insulation under diffuse sound field conditions

Lärmschutzvorrichtungen an Straßen - Prüfverfahren zur Bestimmung der akustischen Eigenschaften - Teil 2: Produktspezifische Merkmale der Luftschalldämmung in diffusen Schallfeldern

Dispositifs de réduction du bruit du trafic routier - Méthode d'essai pour la détermination de la performance acoustique - Partie 2 : Caractéristiques intrinsèques de l'isolation aux bruits aériens dans des conditions de champ acoustique diffus

Ta slovenski standard je istoveten z: **prEN 1793-2**

ICS:

17.140.30	Emisija hrupa transportnih sredstev	Noise emitted by means of transport
93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

oSIST prEN 1793-2:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 1793-2

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ICS 17.140.30; 93.080.30

Will supersede EN 1793-2:2018

English Version

Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 2: Intrinsic characteristics of airborne sound insulation under diffuse sound field conditions

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 226.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN 1793-2:2023 E

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European foreword

This document (prEN 1793-2:2023) 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 1793-2:2018.

EN 1793-2:2023 includes the following significant technical changes with respect to EN 1793-2:2018:

— The title has been slightly changed.

— The declaration of measurement uncertainty and the related confidence level is now mandatory.

— The categories of single-number rating have been removed. Prior Annex A has been deleted. The performance of the noise reducing device is, from now on, only to be reported in terms of the numeric values of the single-number rating.

— An annex with the values of the standard deviation of reproducibility and repeatability has been added; this makes possible the declaration of the measurement uncertainty and the related confidence level, which is now mandatory (Annex B).

— A detailed example has been added, including the declaration of the uncertainty (Annex C).

EN 1793-3:2023 is part of a series of documents and will 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 1793-3:2023, *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*;

— EN 1793-6:2023, *Road traffic noise reducing devices - Test method for determining the acoustic performance – Part 6: Intrinsic characteristics - Airborne sound insulation under direct sound field conditions*.

Introduction

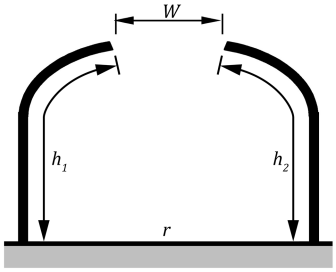
Noise reducing devices alongside roads should provide adequate sound insulation so that sound transmitted through the device is not significant compared with the sound diffracted over the top. This document specifies a test method for qualifying the intrinsic airborne sound insulation performance for noise reducing devices designed for roads in reverberant conditions, e.g. inside tunnels or deep trenches or under covers.

The measurement results of this method for airborne sound insulation are comparable but not identical with the results of the test method EN 1793-6:2021, mainly because the present method uses a diffuse sound field, while the other method assumes a directional sound field. Research studies suggest that good correlation exists between field data, measured according to EN 1793-6:2021 and laboratory data, measured according to the method described in the present document [1], [2], [3], [4].

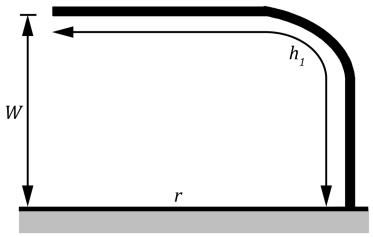
This document is not concerned with determining insertion loss (extrinsic performance) which additionally depends on factors which are not related to the product itself; e.g. the dimensions of the barrier and quality of installation work and site factors such as ground impedance, site geometry, etc. The test is designed to allow the intrinsic airborne sound insulation performance of the device to be measured; the resulting rating should aid the selection of devices for reverberant roadside applications.

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 geometric 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 geometric envelope is less than or equal to 25 %, i.e. reverberant conditions occur when $w/e \leq 0{,}25$, where $e = (w+h_1+h_2)$.

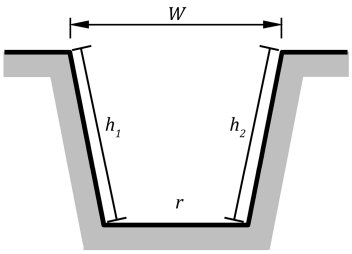
NOTE This method can be used to qualify noise reducing devices for other applications, e.g. to be installed nearby industrial sites. In this case, the single-number ratings can preferably be calculated using an appropriate spectrum.



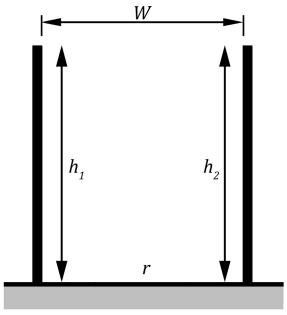
a) Partial cover on both sides of the road; geometric envelope, $e = w+h_1+h_2$



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



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



d) Tall barriers or buildings; geometric 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 specifies the laboratory method for measuring the airborne sound insulation performance of road traffic noise reducing devices in reverberant conditions. It covers the assessment of the intrinsic performance of barriers that can reasonably be assembled inside the testing facility described in EN ISO 10140-2 and EN ISO 10140-4.

This method is not intended for the determination of the intrinsic characteristics of airborne sound insulation of noise reducing devices to be installed on roads in non-reverberant conditions.

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 1793-3:2021, *Road traffic noise reducing devices - Test method for determining the acoustic performance – Part 3: Normalized traffic noise spectrum*

EN ISO 10140-1:2016, *Acoustics - Laboratory measurement of sound insulation of building elements – Part 1: Application rules for specific products (ISO 10140-1)*

EN ISO 10140-2:2010, *Acoustics - Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation (ISO 10140-2)*

EN ISO 10140-3:2010, *Acoustics - Laboratory measurement of sound insulation of building elements – Part 3: Measurement of impact sound insulation (ISO 10140-3)*

EN ISO 10140-4:2010, *Acoustics - Laboratory measurement of sound insulation of building elements – Part 4: Measurement procedures and requirements (ISO 10140-4)*

EN ISO 10140-5:2010, *Acoustics - Laboratory measurement of sound insulation of building elements – Part 5: Requirements for test facilities and equipment (ISO 10140-5)*

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

ISO 12999-1:2020, *Acoustics - Determination and application of measurement uncertainties in building acoustics - Sound insulation*

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

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 (3.5), 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.

4 Symbols and abbreviations

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

Table 1 — Symbols and abbreviations

Symbol or abbreviation	Designation	Unit
DL_R	Single-number rating of airborne sound insulation performance expressed as a difference of A weighted sound pressure levels	dB
R_i	Sound reduction index in the i^{th} one-third octave band	dB
k_p	Coverage factor	-
L_i	Normalized A weighted sound pressure level of traffic noise in the i^{th} one-third octave band defined in EN 1793-3	dB
s_r	Standard deviation of repeatability	-
s_R	Standard deviation of reproducibility	-
u	Standard uncertainty	-
U	Expanded uncertainty	-

5 Test arrangement

The test arrangement shall be as described in EN ISO 10140-1, EN ISO 10140-2 and EN ISO 10140-4 for partitions with the following modifications:

— The test specimen shall be mounted in the test opening and assembled in the same manner as the manufactured device is used in practice with the same connections and seals between component parts. The edge supports shall not overlap the sample by more than 70 mm and shall be sealed to prevent the leakage of sound.

— Where posts are employed in construction, at least one post shall be included in the specimen with panels attached on both sides. The length of the panels on one side of the post shall be ≥ 2 m (see Figure 2). The side that would face the traffic shall face the source room.

— The sample under test, excluding the plinth for levelling, shall have a windowed area not less than 9,5 m^2.

— The sample surface area to be used in calculations shall be the total surface area of the sample excluding the plinth for levelling and the overlap surface of the edge supports.