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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

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

Lärmschutzeinrichtungen an Straßen - Prüfverfahren zur Bestimmung der akustischen Eigenschaften - Teil 2: Produktspezifische Merkmale der Luftschalldämmung unter den Bedingungen eines diffusen Schallfeldes

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

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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

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ICS 17.140.30; 93.080.30

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English Version

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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.

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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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (prEN 1793-2:2010) 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 1793-2:1997.

It should be read in conjunction with:

EN 1793-1*, Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 2 : Intrinsic characteristics of airborne sound insulation for diffuse sound fields*

EN 1793-3:1998, *Road traffic noise reducing devices - Test method for determining the acoustic performance – Part 3: Normalized traffic noise spectrum*

CEN/TS 1793-4, *Road traffic noise reducing devices - Test method for determining the acoustic performance – Part 4: Intrinsic characteristics – In situ values of sound diffraction*

CEN/TS 1793-5, *Road traffic noise reducing devices - Test method for determining the acoustic performance – Part 5: Intrinsic characteristics – In situ values of sound reflection under direct sound field conditions*

prEN 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*

Introduction

Noise reducing devices alongside roads have to provide adequate sound insulation so that sound transmitted through the device is not significant compared with the sound diffracted over the top. This European Standard 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, mainly because the present method uses a diffuse sound field, while the other method assumes a directional sound field. However, research studies suggest that a quite good correlation exists between the two methods.

The test method described in this European Standard should not be used to determine the intrinsic characteristics of airborne sound insulation for noise reducing devices to be installed on roads in non-reverberant conditions.

This standard is **not** concerned with determining 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 and the resulting rating should aid the selection of devices for reverberant roadside applications.

NOTE This method may be used to qualify noise reducing devices for applications in other reverberant conditions, e.g. found along railways or near industrial sites. In these cases the single-number ratings should be calculated using an appropriate spectrum.

1 Scope

This European Standard 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 which can reasonably be assembled inside the testing facility described in EN ISO 140-3.

This method is not intended for the following applications:

- 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 referenced documents are indispensable for the application 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, 1997, Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 3: Normalized traffic noise spectrum

EN ISO 140-3, Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3 : Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)

prEN 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.

3 Symbols

For the purposes of this standard, the following symbols apply:

R_i	Sound reduction index in the i^{th} one-third octave band
L_i	Normalized A-weighted sound pressure level, in decibels, of traffic noise in the i^{th} one-third octave band defined in EN 1793-3
DL_R	Single-number rating of airborne sound insulation performance expressed as a difference of A-weighted sound pressure levels, in decibels

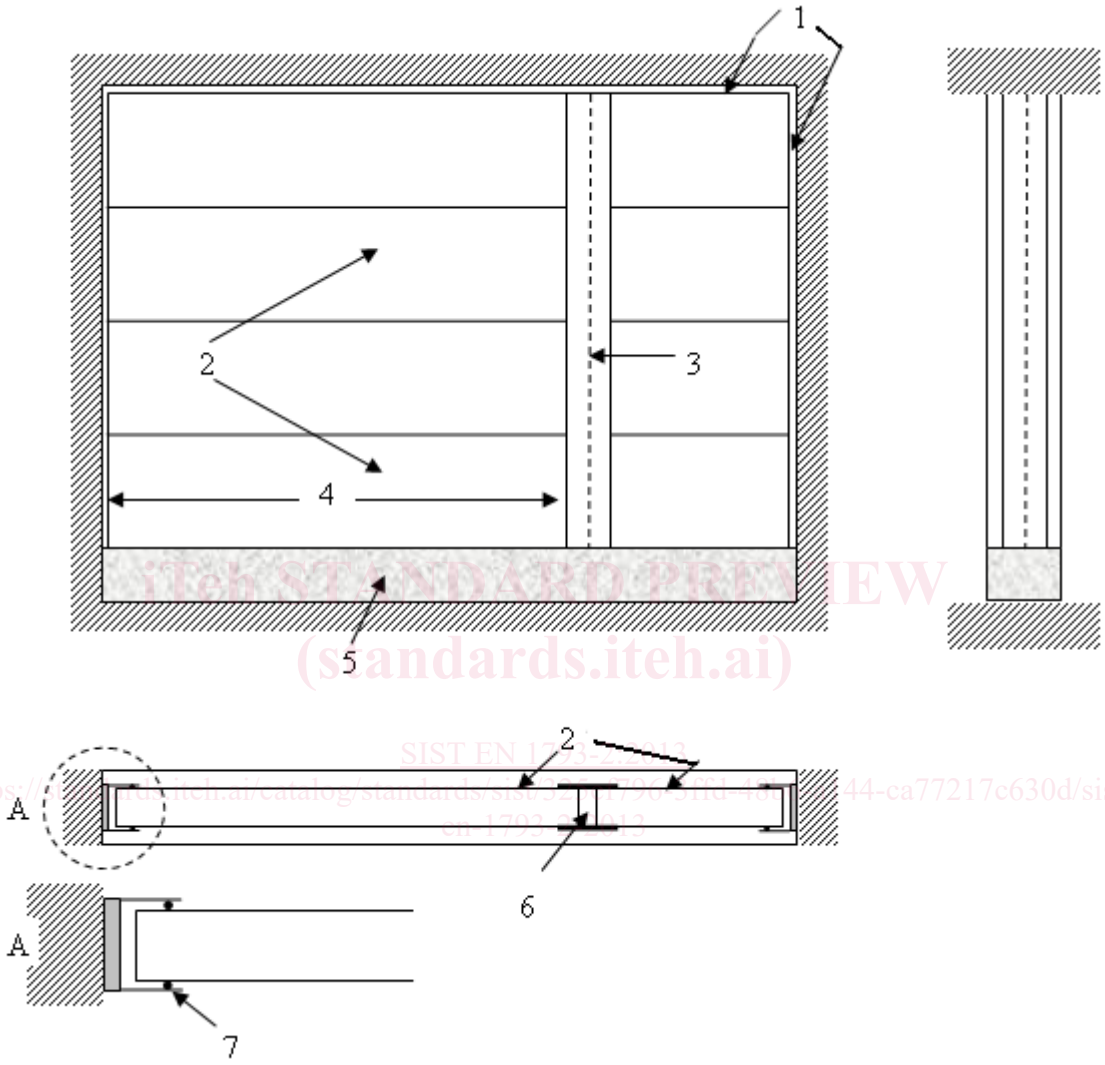
4 Test arrangement

The test arrangement shall be as described in EN ISO 140-3 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 1). 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.



Key:

1	Sealing materials	5	Bricked up plinth for levelling (if necessary)
2	Panels (sealed as in practice)	6	Post (sealed as in practice)
3	Post	7	Sealing materials to prevent edge leakage
4	L ≥ 2 m		

Figure 1 - Mounting conditions for test specimen

5 Test procedure and evaluation

5.1 Test method

The sound reduction indices R_i in each one-third octave band in the range 100 Hz to 5 kHz shall be determined using the method described in EN ISO 140-3.

5.2 Single-number rating of sound absorption DL_α

A single-number rating shall be derived to indicate the performance of the product. The individual sound reduction indices shall be weighted according to the normalized traffic noise spectrum defined in EN 1793-3.

The single-number rating of airborne sound insulation DL_R, in decibels, is given by :

$$DL_R = -10 \lg \left| \frac{\sum_{i=1}^{18} 10^{0.1\,L_i}\ 10^{-0.1\,R_i}}{\sum_{i=1}^{18} 10^{0.1\,L_i}} \right|$$

NOTE Annex B provides guidance on the use of the single-number rating.

6 Measurement uncertainty

The uncertainty of results obtained from measurements according to this European Standard shall be evaluated, preferably in compliance with ISO/IEC Guide 98. If reported, the expanded uncertainty together with the corresponding coverage factor for a stated coverage probability of 95% as defined in ISO/EC Guide 98 shall be given. More information on measurement uncertainty is given in Annex C.

7 Test report

7.1 Expression of results

The one-third octave band values of the sound reduction indices R_i shall be given at all frequencies of measurement in tabular form and in the form of a graph.The indices shall be rounded to the nearest first decimal place.

The single-number rating of airborne sound insulation DL_R shall be reported after being rounded to the nearest integer.

If the airborne sound insulation performance is to be categorized then this shall be in accordance with annex A.

7.2 Further information

The test report shall include the information listed below:

a) reference to this document;

b) name and address of testing organisation;

c) date of the test;

d) a description of test conditions, procedures and equipment used, in accordance with EN ISO 140-3;

e) a full description of the test specimen including manufacturer's name and product identifier with sectional drawings and photographs of mounting conditions ; masses, densities, dimensions and specifications of panels, posts and seals, including any internal components, shall be given ;

f) signature of the person responsible for the measurements.