
Protihrupne ovire za cestni promet – Preskusna metoda za ugotavljanje akustičnih lastnosti – 1. del: Karakteristike, značilne za absorpcijo zvoka

Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 1: Intrinsic characteristics of sound absorption

Lärmschutzeinrichtungen an Straßen - Prüfverfahren zur Bestimmung der akustischen Eigenschaften - Teil 1: Produktspezifische Merkmale der Schallabsorption

Dispositifs de réduction du bruit du trafic routier - Méthode d'essai pour la détermination de la performance acoustique - Partie 1: Caractéristiques intrinseques relatives a l'absorption acoustique

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Ta slovenski standard je istoveten z: EN 1793-1:1997

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 |

SIST EN 1793-1:1999**en**

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EUROPEAN STANDARD

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Descriptors: environmental protection, acoustics, noise: sound, roads, traffic lanes, acoustic shields, acoustic tests, laboratory tests, acoustic measurements, noise reduction, acoustic absorption

English version

**Road traffic noise reducing devices - Test method
for determining the acoustic performance - Part 1:
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226 "Road equipment", the secretariat of which is held by AFNOR.

This European Standard consists of the following parts under the general title :

Road traffic noise reducing devices - Test method for determining the acoustic performance :

- Part 1 : Intrinsic characteristics of sound absorption ;
- Part 2 : Intrinsic characteristics of airborne sound insulation ;
- Part 3 : Normalized traffic noise spectrum.

The following parts have not yet been prepared but research is being carried out within the European Research Programme "Testing and Measurement":

- Part 4 : Extrinsic characteristics of *in situ* efficiency ;
- Part 5 : Intrinsic characteristics of *in situ* values of sound absorption and airborne sound insulation.

Annex A of this part of EN 1793 is normative and annex B is for information only.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 1998, and conflicting national standards shall be withdrawn at the latest by March 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Where a sound reflecting surface is installed along a road it may be effective to use sound absorbing devices on its traffic side to reduce additional noise nuisance caused by reflected sound. This treatment may be needed in the presence of the following :

- noise barriers, rocks or retaining walls that can reflect sound waves toward unprotected areas,
- vertical cuttings or reflective surfaces that face each other,
- tunnels and their approaches,
- traffic passing close to a barrier where reflections between the vehicles and the barrier may reduce effectiveness.

This standard specifies a test method for assessing the sound absorption performance of noise reducing devices designed for roads (a measure of intrinsic performance). It is not concerned with determining *in-situ* performance (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 sound absorption performance of the device to be measured and the resulting rating should aid the selection of devices for particular roadside applications.

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1 Scope

This standard specifies the laboratory method for measuring the sound absorption of flat noise barriers or flat cladding for retaining walls or tunnels. It covers the assessment of the intrinsic sound absorption performance of roadside noise reducing devices which can reasonably be assembled inside the testing facility described in EN 20354.

The test method in EN 20354, referred to in this standard, is strictly valid only for plane absorbers and in particular excludes devices which act as weakly damped resonators. Some devices will depart significantly from these requirements and in these cases care is needed in interpreting the results.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

| | |
|-----------|---|
| EN 20354 | Acoustics - Measurement of sound absorption in a reverberation room (ISO 354 : 1985) |
| EN 1793-3 | Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 3 : Normalized traffic noise spectrum |

3 Symbols

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

α_{Si} Sound absorption coefficient 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_{α} Single-number rating of sound absorption 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 20354 with the following modifications :

- The test specimen shall be assembled in the test chamber in the same manner as the manufactured device, with the same connections and seals between component parts;
- All the reflecting parts exposed on the traffic side of the material (posts, brackets and other parts) shall be present on the specimen as in practice ;
- 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 inner part of the room ; <https://standards.iteh.ai/catalog/standards/sist/e3c6d8ac-6fe4-4177-b68c-06778964a735/sist-en-1793-1-1999>
- For testing barriers, the specimen shall be placed directly against one of the surfaces (floor, wall or ceiling) of the chamber, without gaps as far as possible ;
- For testing absorptive cladding for use on retained cuttings, tunnel walls and other reflective surfaces the specimen shall be mounted against one of the surfaces of the chamber leaving the same gap as proposed for the actual construction. In these conditions, the distance between the back of the sample and the surface of the chamber shall be clearly reported.

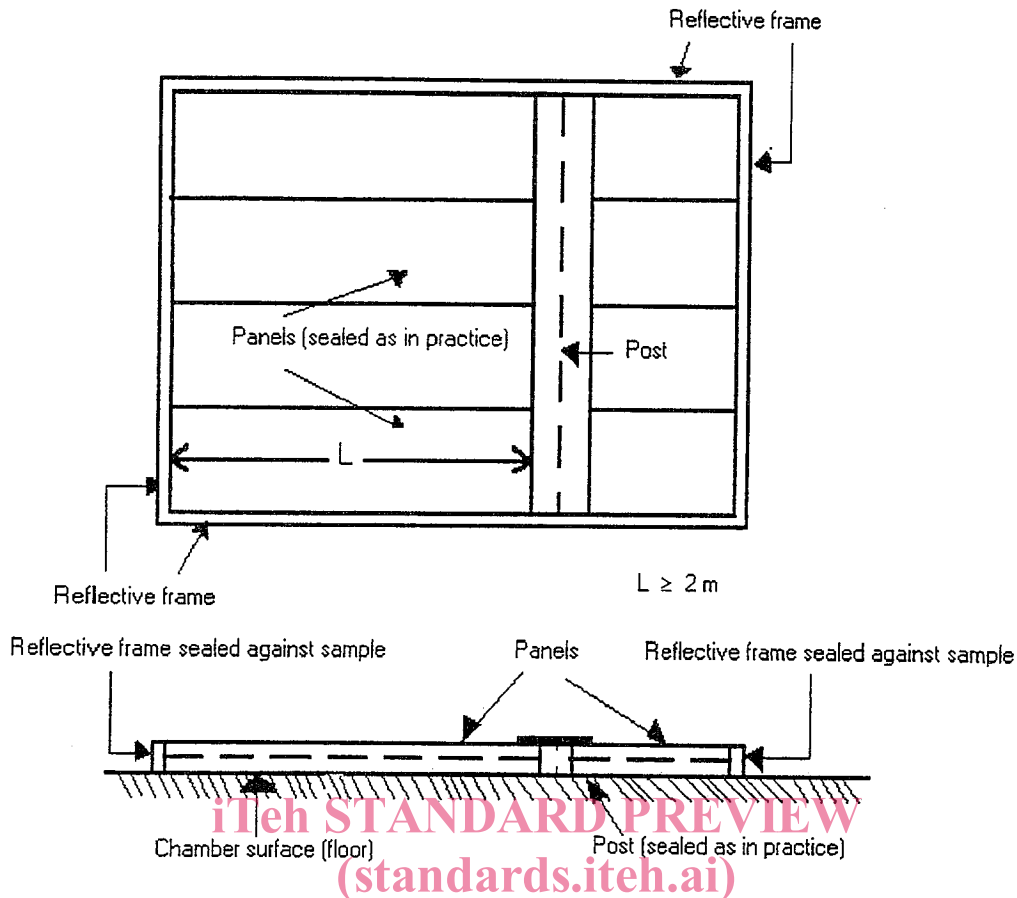


Figure 1 : Illustration of post arrangement

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5 Test procedure and evaluation

5.1 Test method

The sound absorption coefficients α_{si} in each one-third octave band in the range 100 Hz to 5 kHz shall be determined using the method described in EN 20354.

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 absorption coefficients shall be weighted according to the normalized traffic noise spectrum defined in EN 1793-3.

The single-number rating of sound absorption DL_{α} , in decibels, is given by :

$$DL_{\alpha} = -10 \lg \left| 1 - \frac{\sum_{i=1}^{18} \alpha_{si} 10^{0.1 L_i}}{\sum_{i=1}^{18} 10^{0.1 L_i}} \right|$$

In some cases the ratio of the summations term in the expression of DL_{α} can exceed 1 which precludes the calculation of DL_{α} . For this reason the maximum value of this ratio shall be limited to 0,99.

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

6 Test report

6.1 Expression of results

The one-third octave band values of the sound absorption coefficients α_s shall be given at all frequencies of measurement in tabular form and in the form of a graph. The coefficients shall be rounded to the nearest second decimal place.

The single-number rating of sound absorption DL_{α} shall be reported after being rounded to the nearest integer.

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

6.2 Further information

The test report shall contain (standards.iteh.ai)

- a) Number and year of this European Standard EN 1793-1, 199X ;
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- b) a description of test conditions including mounting position (floor, wall or ceiling), procedures and equipment used in accordance with EN 20354 ;
- c) a full description of the test specimen including manufacturer's name and product identifier with sectional drawings and photographs showing mounting conditions ; masses, densities, dimensions and specifications of panels, posts and seals, including any internal components, shall be given ;
- d) the name and address of the organization which performed the measurements.