SLOVENSKI STANDARD
SIST EN 1793-1:2013

01-februar-2013

Nadomešča:
SIST EN 1793-1:1999

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 intrinsèques de l'absorption acoustique

Ta slovenski standard je istoveten z: **EN 1793-1:2012**

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 1793-1:2013 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1793-1

November 2012

ICS 17.140.30; 93.080.30

Supersedes EN 1793-1:1997

English Version

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

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

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

This European Standard was approved by CEN on 29 September 2012.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists 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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COMITÉ EUROPÉEN DE NORMALISATION
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Ref. No. EN 1793-1:2012: E

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Foreword

This document (EN 1793-1:2012) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

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 May 2013, and conflicting national standards shall be withdrawn at the latest by March 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1793-1:1997.

In the previous version of this European Standard, the basic test method was derived from EN 20354:1985; in the current version of this European Standard, the basic test method is derived from EN ISO 354:2003. This change is concerned with how to consider the sound attenuation in the air (see explanations under the last paragraph of the Introduction).

EN 1793-1 is part of a series and should be read in conjunction with the following:

— EN 1793-2, *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*;

— EN 1793-3, *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 and airborne sound insulation*;

— 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*.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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 European Standard specifies a test method for qualifying the sound absorption performance of noise reducing devices designed for roads (a measure of intrinsic performance). It is not concerned with determining insertion loss (extrinsic performance) which depends on additional 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; the resulting rating should aid the selection of devices for particular roadside applications.

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

In the previous version of this European Standard dated September 1997, the basic test method was derived from EN 20354:1985. In the current version of this European Standard, the basic test method is derived from EN ISO 354:2003. In the current version of the basic test method, an essential change was introduced compared to the previous version, viz. the application of a correction method for changes in sound attenuation in air caused by changes in air temperature and humidity during the test. Because this correction was not applied in the previous version of the test method, the results from the current version may deviate considerably from the results obtained with the previous version of the method. Specifically for test samples with a high absorption coefficient, these changes may amount to 1 dB or 2 dB for the single number rating DL_{α}, either in a positive or a negative sense. The effect of the application of the correction will be most noticeable in the higher frequency bands. To avoid possible confusion between the old and the new measurement results, the continued use of measurement results obtained with the previous version of this European Standard (dated September 1997) is not recommended.

1 Scope

This European 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 that can reasonably be assembled inside the testing facility described in EN ISO 354.

The test method in EN ISO 354 referred to in this European Standard is strictly valid only for plane absorbers; in particular, it excludes devices that act as weakly damped resonators. Some devices will depart significantly from these requirements and in these cases care is needed in interpreting the results.

NOTE The test method in EN ISO 354 is based on measurements in a reverberation room where diffuse sound field conditions prevail. As a uniformly applicable method for the determination of the sound absorptive performance of noise reducing devices under free field conditions is still under development, the measurement results according to this European Standard are temporarily considered relevant for application on noise reducing devices in reverberant as well as in free field conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 3: Normalized traffic noise spectrum*

EN ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354)*

3 Symbols

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

α_{Si}	Sound absorption coefficient in the i^{th} one-third octave band
L_i	Normalised 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 ISO 354 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.

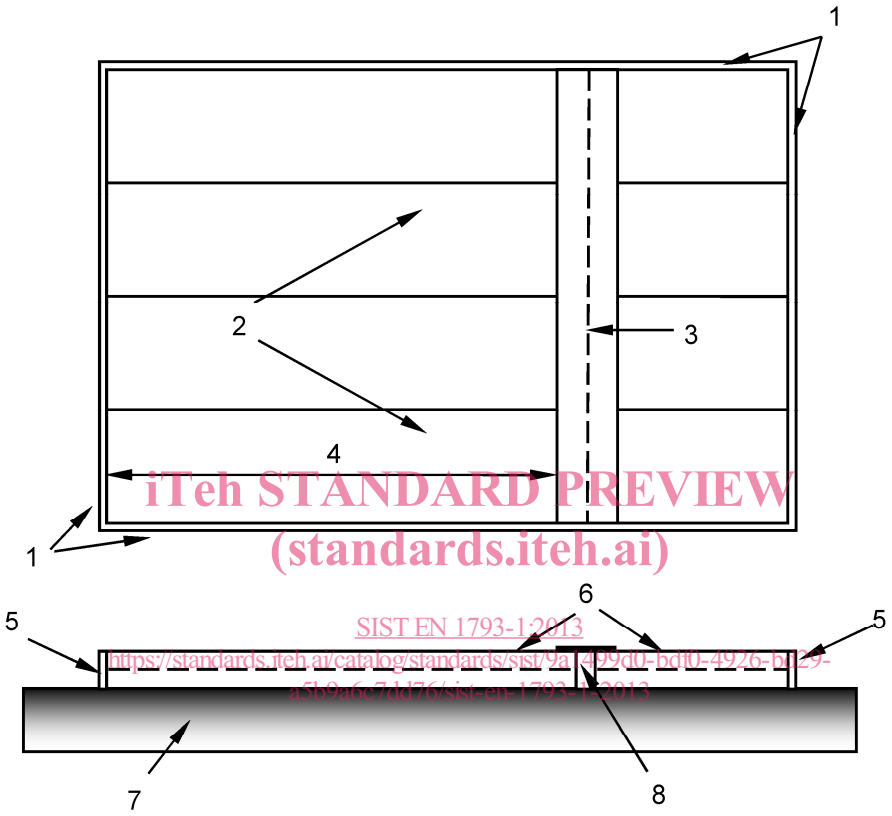
— All the reflecting parts exposed on the traffic side of the material (posts, brackets and other parts) shall be present on the specimen as in practice.

— 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.

— For testing barriers, the specimen shall be placed directly against one of the surfaces (floor, wall or ceiling) of the chamber, without air gaps. If the use of posts according to the instruction given above

would introduce an air gap between the back of the noise barrier elements and the surface of the room, modifications shall be made to the posts to ensure that the back of the noise barrier elements is placed directly against the room surface.

— 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 air 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.



Key

1	reflective frame	5	reflective frame (sealed against sample)
2	panels (sealed as in practice)	6	panels
3	post	7	chamber surface (floor)
4	L ≥ 2 m	8	post (sealed as in practice)

Figure 1 — Illustration of post arrangement

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 ISO 354.

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 normalised traffic noise spectrum defined in EN 1793-3.

The single-number rating of sound absorption DL_α, in decibels, is given by:

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

where

DL_α is the single-number rating of sound absorption performance expressed as a difference of A-weighted sound pressure levels, in decibels;

α_{Si} is the sound absorption coefficient in the i^{th} one-third octave band;

L_i is the normalised A-weighted sound pressure level, in decibels, of traffic noise in the i^{th} one-third octave band defined in EN 1793-3.

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_{Si} 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 categorised then this shall be in accordance with Annex A.

6.2 Further information

The test report shall include the information listed below:

a) reference to this European Standard;

b) name and address of testing organisation;

c) date of the test;

d) description of test conditions including mounting position (floor, wall or ceiling), procedures and equipment used in accordance with EN ISO 354;