

Road traffic noise reducing devices - Test method for determining the acoustic performance - Part 4: Intrinsic characteristics - In situ values of sound diffraction

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Road traffic noise reducing devices - Test method for
determining the acoustic performance - Part 4: Intrinsic
characteristics - In situ values of sound diffraction

Dispositifs de réduction du bruit du trafic routier - Méthode
d'essai pour la détermination des performances
acoustiques - Partie 4: Caractéristiques intrinsèques -
Valeurs in-situ de la diffraction acoustique

Lärmschutzvorrichtungen an Straßen - Prüfverfahren zur
Bestimmung der akustischen Eigenschaften - Teil 4:
Produktspezifische Merkmale - In-situ-Werte der
Schallbeugung

This European Standard was approved by CEN on 13 December 2014.

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

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Foreword

This document (EN 1793-4:2015) 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of an identical text or by endorsement, at the latest by September 2015 and conflicting national standards shall be withdrawn at the latest by September 2015.

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 CEN/TS 1793-4:2003.

The major changes compared to the previous published version are:

- the airborne sound insulation characteristics of the reference wall are specified in terms of the minimum values of the Sound Insulation Index, measured according to EN 1793-6, it needs to have;
- the sound absorbing characteristics of the reference wall are specified in terms of the minimum values of the sound absorption coefficient, measured according to EN ISO 354, it needs to have when lined on the source side with an absorptive flat layer of a single porous material;
- the sound source positions have been reduced from six to four and are now all obligatory;
- the microphone positions have been reduced from 12 to 10 and are now all obligatory;
- a "free-field" impulse response to be measured for each microphone position and therefore a geometrical spreading correction factor is no more needed in Formula (1);
- consideration of the measurement uncertainty has been added (see Clause 5 and Annex B);
- the summary of the test procedure (Clause 6) has been updated to reflect the changes compared to the previous published version.

This document should be read in conjunction with:

EN 1793-1, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 1: Intrinsic characteristics of sound absorption 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 1793-5, *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 organizations 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

Part of the market of road traffic noise reducing devices is constituted of products to be added on the top of noise reducing devices and intended to contribute to sound attenuation acting primarily on the diffracted sound field. These products will be called added devices. This European Standard has been developed to specify a test method for determining the acoustic performance of added devices.

The test method can be applied *in situ*, i.e. where the traffic noise reducing devices and the added devices are installed. The method can be applied without damaging the traffic noise reducing devices or the added devices.

The method can be used to qualify products before the installation along roads as well as to verify the compliance of installed added devices to design specifications. Repeated application of the method can be used to verify the long term performance of added devices.

This method could be used to qualify added devices for other applications, e.g. to be installed along railways or nearby industrial sites. In this case, special care needs to be taken into account in considering the location of the noise sources and the single-number ratings should be calculated using an appropriate spectrum.

No other national or international standard exists about the subject of this European Standard.

1 Scope

This European Standard describes a test method for determining the intrinsic characteristics of sound diffraction of added devices installed on the top of traffic noise reducing devices. The test method prescribes measurements of the sound pressure level at several reference points near the top edge of a noise reducing device with and without the added device installed on its top. The effectiveness of the added device is calculated as the difference between the measured values with and without the added devices, correcting for any change in height (the method described gives the acoustic benefit over a simple barrier of the same height; however, in practice the added device can raise the height and this could provide additional screening depending on the source and receiver positions).

The test method is intended for the following applications:

- preliminary qualification, outdoors or indoors, of added devices to be installed on noise reducing devices;
- determination of sound diffraction index difference of added 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 added devices (with a repeated application of the method);
- interactive design process of new products, including the formulation of installation manuals.

The test method can be applied both *in situ* and on samples purposely built to be tested using the method described here.

Results are expressed as a function of frequency, in one-third octave bands between 100 Hz and 5 kHz. If it is not possible to get valid measurements results over the whole frequency range indicated, the results shall be given in the restricted frequency range and the reasons of the restriction(s) shall be clearly reported. A single-number rating is calculated from frequency data.

For indoors measurements see Annex A.

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 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*

EN 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

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

ISO/IEC Guide 98, *Guide to the expression of uncertainty in measurement (GUM)*