SLOVENSKI STANDARD
SIST EN 14389-1:2008

01-september-2008

Protihrupne ovire za cestni promet - Postopki za ocenjevanje uļ inkovitosti na daljavo - 1. del: Akustiļ ne lastnosti

Road traffic noise reducing devices - Procedures for assessing long term performance - Part 1: Acoustical characteristics

Lärmschutzeinrichtungen an Straßen - Verfahren zur Bewertung der Langzeitwirksamkeit - Teil 1: Akustische Eigenschaften

Dispositifs de réduction du bruit du trafic routier - Méthodes d'évaluation des performances a long terme - Partie 1 : Caractéristiques acoustiques

Ta slovenski standard je istoveten z: **EN 14389-1:2007**

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 14389-1:2008 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14389-1

December 2007

ICS 93.080.30

English Version

Road traffic noise reducing devices - Procedures for assessing long term performance - Part 1: Acoustical characteristics

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

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Contents

Foreword

This document (EN 14389-1:2007) 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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

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

This document should be read in conjunction with:

— EN 14389-2, Road traffic noise reducing devices - Procedures for assessing long term performance - Part 2: Non-acoustical characteristics;

— 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 14388, Road traffic noise reducing devices - Specifications;

— EN 60721-3-4, Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities. Section 4: Stationary use at non-weatherprotected locations (IEC 60721-3-4:1995).

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Road Traffic Noise Reducing Devices alongside roads are not only required to fulfil their acoustic function and structural design requirements in accordance with appropriate European Standards, but also to maintain their performance for a reasonably economic working life.

The acoustic elements have to resist the actions of agents within the roadside environment that could significantly degrade their performance.

The acoustic characteristics of a Road Traffic Noise Reducing Device can deteriorate significantly over the duration of its working life if it is not installed or maintained in accordance with the manufacturer's recommendations, or if the materials are not appropriate for the roadside environment.

Until now no methods exist that could be used for the evaluation of the durability of acoustic characteristics of noise reducing devices. Therefore new methods were introduced in CEN/TS 1793-5, which are designated in this standard. The use of these methods may produce values for the sound reflection DL_{RI} of noise reducing devices that are different from the values of sound absorption DL_{α} resulting from EN 1793-1, which are the basis for the product characterisation of absorptive noise reducing devices. These differences should be disregarded as far as product characterisation is concerned. The values of sound reflection resulting from the tests according to CEN/TS 1793-5 are only used in this standard as a comparative means for evaluation of the long-term durability.

1 Scope

This European Standard defines the means for evaluating the acoustic durability of Road Traffic Noise Reducing Devices.

In this European Standard, the sound absorption is characterised by the single-number rating of sound reflection DL_{RI} as defined in CEN/TS 1793-5. The airborne sound insulation is characterised by single-number rating of airborne sound insulation DL_{SI} as defined in CEN/TS 1793-5.

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.

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 60721-3-4, *Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weatherprotected locations (IEC 60721-3-4:1995)*

3 Terms and definitions

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

3.1
structural elements
elements whose primary function is to support or hold in place acoustic elements

3.2
acoustic elements
elements whose primary function is to provide the acoustic performance of the device

4 Requirements

4.1 General

The manufacturer shall declare the estimated reduction in the acoustic performance of the Road Traffic Noise Reducing Device after 5 years, 10 years, 15 years and 20 years service in given exposure classes assuming its maintenance in accordance with the manufacturer's recommendations.

The durability of the acoustic characteristics shall be assessed either by descriptive solutions based upon estimated performance of materials used, by reference to the appropriate European material standards, or comparative performance testing according to CEN/TS 1793-5. The assessment of performance may be carried out either by physical examination, or testing in accordance with CEN/TS 1793-5.

- To be able to evaluate the variations of the acoustic characteristics in accordance with CEN/TS 1793-5, it is necessary, to have an evaluation of the acoustic characteristics corresponding to the installation service to carry out an initial in-situ test in accordance with 4.3.

4.2 Declaration of the expected durability of acoustic performance

The manufacturer shall declare the expected durability of acoustic performance of the product in the format shown in Table 2, under the combination of all the typical exposure classes identified in Table 1. Where the evaluation of the product includes one or more of the special exposure classes identified in Table 1, the corresponding durability under each of these conditions shall be declared in a supplementary table as shown in Table 3. The durability of acoustic performance shall be expressed in dB as changes in DL_{RI} and/or DL_{SI} compared to the initial values, as defined in CEN/TS 1793-5.

Table 1 - Environmental parameters and their classes

EN 60721-3-4 Table Reference	Environmental Condition	Environmental Parameter	Typical Exposure Classes	Special Exposure Classes
1	Climatic Conditions	All	4K2	4K3[1]
2	Special Climatic Conditions	Water from sources other than rain	4Z7	
3	Biological Conditions	All	4B1	4B2[2]
4	Chemically Active Substances	Sea Salts and Road Salts	4C2	
		Hydrogen Sulphide	4C3	
		Ozone	4C2	4C4[3]
		Nitrogen Oxides	4C4	
		All others	4C2	
5	Mechanically Active Substances	Dust (suspension)	4S2	
6	Mechanical Conditions	Non-stationary vibration	4M4	

[1] Class applicable to cold climates.

[2] Class applicable in conditions where termite attack is likely.

[3] Class only applicable in marine/coastal environment.

Table 2 - Expected durability of acoustic performance as defined by CEN/TS 1793-5 Typical exposure classes

Years of exposure	5	10	15	20
Change in sound absorption DL_{RI}				
Change in airborne sound insulation DL_{SI}				

Table 3 - Expected durability of acoustic performance as defined by CEN/TS 1793-5 Special exposure class(es)

Special exposure class(es)	eg : Climatic Conditions: 4K3			
Years of exposure	5	10	15	20
Change in sound absorption DL_{RI}				
Change in airborne sound insulation DL_{SI}				

4.3 Assessment of actual acoustic durability by descriptive methods

4.3.1 Sound absorption

Physical examination shall be on the basis of displacements or changes in the constitution or state of the absorptive material and/or its protective device that could affect their sound absorption performance (for example disintegration of fibres or fragile materials, dust, water saturation, freeze and thaw, UV light, blocked pores, effects of location, displacement of elements).

4.3.2 Airborne sound insulation

Physical examination shall be on the basis of visible displacements or changes in the constitution or state of the materials and/or its fixing devices that could affect their airborne sound insulation performance (for example relative position and sealing between elements, holes, cracks, perforations, damaged coating, loosening of fixing systems).

4.3.3 Results of physical examination

If the physical examination carried out in accordance with 4.3.1 and 4.3.2 identifies changes that could affect the acoustic performance of an element, an in-situ test on the suspect area (the area of an element which has undergone changes which may affect the acoustic performance of that element) may be carried out in accordance with the requirements of 4.4.

4.4 Assessment of actual durability by performance testing in situ

Testing shall be carried out in accordance with CEN/TS 1793-5.

The results of the tests on the exposed section of Road Traffic Noise Reducing Device (single number rating of sound absorption and/or airborne sound insulation) shall be compared with results of similar in-situ tests on an