



SLOVENSKI STANDARD

SIST EN 1794-1:2011

01-julij-2011

Nadomešča:
SIST EN 1794-1:2004

Protihrupne ovire za cestni promet - Neakustične lastnosti - 1. del: Mehanske lastnosti in zahteve za stabilnost

Road traffic noise reducing devices - Non-acoustic performance - Part 1: Mechanical performance and stability requirements

Lärmschutzeinrichtungen an Straßen - Nichtakustische Eigenschaften - Teil 1: Mechanische Eigenschaften und Anforderungen an die Standsicherheit

Dispositifs de réduction du bruit du trafic routier - Performances non acoustiques - Partie 1: Performances mécaniques et exigences en matière de stabilité

Ta slovenski standard je istoveten z: EN 1794-1:2011

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 1794-1:2011

en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1794-1

January 2011

ICS 93.080.30

Supersedes EN 1794-1:2003

English Version

Road traffic noise reducing devices - Non-acoustic performance - Part 1: Mechanical performance and stability requirements

Dispositifs de réduction du bruit du trafic routier -
Performances non acoustiques - Partie 1: Performances
mécaniques et exigences en matière de stabilité

Lärmschutzeinrichtungen an Straßen - Nichtakustische
Eigenschaften - Teil 1: Mechanische Eigenschaften und
Anforderungen an die Standsicherheit

This European Standard was approved by CEN on 10 December 2010.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, 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 United Kingdom.

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Contents

	page
Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	6
5 Requirements	7
5.1 General.....	7
5.2 Wind load and static load	7
5.3 Vibration and fatigue effects	7
5.4 Self weight	7
5.5 Impact of stones	7
5.6 Safety in collision	7
5.7 Dynamic forces from snow clearance	7
6 Test report	8
Annex A (normative) Wind load and static load	9
Annex B (normative) Self weight.....	16
Annex C (normative) Impact of stones	19
Annex D (normative) Safety in collision	22
Annex E (normative) Dynamic load from snow clearance	23
Bibliography	26

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Foreword

This document (EN 1794-1:2011) 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 July 2011, and conflicting national standards shall be withdrawn at the latest by July 2011.

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 1794-1:2003.

This European Standard consists of the following parts under the general title "*Road traffic noise reducing devices — Non acoustic performance*".

— *Part 1: Mechanical performance and stability requirements*

— *Part 2: General safety and environmental requirements*

The main changes compared to the previous edition are:

a) fatigue (A.2.3.2);

b) the wind load for low barriers;

c) addition to Annex A of a note on shape factors.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

While performing their primary function, road traffic noise reducing devices are exposed to a range of forces due to wind, dynamic air pressure caused by passing traffic, and the self weight of its component parts. They can also be subjected to shocks caused by stones or other debris thrown up by vehicle tyres and, in some countries, the dynamic force of snow ejected by equipment used to clear roads in winter. The deflections of a noise reducing device under such loads during its design life should not reduce its effectiveness.

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1 Scope

This European Standard specifies criteria to categorise road traffic noise reducing devices according to basic mechanical performance under standard conditions of exposure, irrespective of the materials used. A range of conditions and optional requirements is provided in order to take into account the wide diversity of practice in Europe. Individual aspects of performance are covered separately in the annexes. Safety considerations in the event of damage to noise reducing devices are covered in Part 2 of this European Standard.

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 1991-1-4, *Eurocode 1: Actions on structures — Part 1-4: General actions — Wind actions*

EN 1317-1, *Road restraint systems — Part 1: Terminology and general criteria for test methods*

EN 1317-2, *Road restraint systems — Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets*

EN 1794-2:2011, *Road traffic noise reducing devices — Non-acoustic performance — Part 2: General safety and environmental requirements*

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3 Terms and definitions

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

3.1

noise barrier

noise reducing device which obstructs the direct transmission of airborne sound emanating from road traffic

3.2

cladding

noise reducing device which is attached to a wall or other structure to reduce the amount of sound reflected

3.3

cover

noise reducing device which either spans or overhangs the highway

3.4

structural element

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

3.5

acoustic element

element whose primary function is to provide the acoustic performance of the device

3.6

mechanical test hammer

device of the type used for measuring the elasticity of hard surfaces

3.7

test area

central area of a full size panel enclosed by a margin of 125 mm from each edge, as shown in Figure C.2

EN 1794-1:2011 (E)**3.8****vehicle occupants safe device**

traffic safe noise reducing device for which a vehicle impact does not cause more danger to the occupants than allowed for safety barriers in EN 1317-2

NOTE However, it does not need to prevent the vehicle from going through it, nor is it presumed that parts of the device are prevented from becoming detached.

3.9**combined safety and noise barrier**

traffic safe noise reducing device which fulfils all the requirements for safety barriers in a given containment class as defined in EN 1317-2

3.10**wind load**

wind load that include all factors in this European Standard

3.11**design wind load**

wind load specific to a geographical region as defined in Eurocodes (EN 1991-2-4)

3.12**dynamic load**

load due to snow thrown against a noise reducing device by snow ploughing equipment

3.13**ploughing speed**

speed of the snow ploughing equipment as it passes the noise barrier

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4 Symbols and abbreviations

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$C_e(z)$	exposure coefficient
C_p	pressure coefficient
d	deflection, in millimetres
d_{hmax}	horizontal maximum deflection, in millimetres
d_{vmax}	vertical maximum deflection, in millimetres
H_{nrd}	total height of acoustic elements constituting the whole reducing device, in millimetres
h_{ae}	height of a single acoustic element, in millimetres
L	length of elements, in millimetres
L_S	greatest length of structural element, in millimetres
L_A	greatest free length of acoustic element (between its supporting structural elements), in millimetres
$q_{(v)}$	dynamic pressure due to passing vehicles, in Pascals
S	load factor
S_G	load factor (weight)
S_W	load factor (wind)

V_{ref}	mean wind velocity at height z , in metres per second
W	wind pressure, in Pascals
z	height above the ground, in metres
ρ	air density, in kilograms per cubic metre

5 Requirements

5.1 General

Under any of the following loads, elements shall not become detached from their supports or fixings.

5.2 Wind load and static load

Limiting values for elastic and permanent deflections shall not exceed the values specified in Annex A.

To ensure connections do not fail load factors shall be applied in accordance with Annex A.

NOTE This European Standard permits specifying authorities to indicate that there is no requirement for resistance to wind or static load.

5.3 Vibration and fatigue effects

All the relevant standards are specified in A.2.3.2.

NOTE This European Standard permits specifying authorities to indicate that there is no requirement for vibration and fatigue effect.

5.4 Self weight

Under standard conditions the deflections shall not exceed the limiting values given in Annex B.

5.5 Impact of stones

Damage caused by controlled impacts shall not exceed the criteria specified in Annex C.

NOTE This European Standard permits specifying authorities to indicate that there is no requirement for resistance to the impact of stones.

5.6 Safety in collision

When safety in collision has to be assessed, the behaviour under impacts specified in EN 1317-2 shall be classified in accordance with Annex D.

NOTE This European Standard permits specifying authorities to indicate that there is no requirement for verification of safety in the event of an impact by an errant vehicle.

5.7 Dynamic forces from snow clearance

When the effects of dynamic forces from snow clearance have to be assessed, this shall be done in accordance with Annex E.

NOTE This European Standard permits specifying authorities to indicate that there is no requirement for resistance to the force of snow thrown sideways by clearance equipment.

EN 1794-1:2011 (E)**6 Test report**

6.1 Every test report on aspects of performance shall include the following information:

- a) number and year of this European Standard, i.e. EN 1794-1:2011;
- b) full description of the element or system tested, including manufacturer(s), part numbers, place and date of origin;
- c) description of the method of sampling, if parts of manufactured elements are evaluated by testing;
- d) place and date of the assessment, and the name of the assessor;
- e) sufficient description of any tests carried out, any results measured and the conclusions drawn about the product together with any illustrations or photographs, all as specified in the appropriate annex.

6.2 A summary report shall be produced, identifying the aspects of performance for which detailed reports are available and the level of performance assessed, where appropriate.

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Annex A (normative)

Wind load and static load

A.1 General

The methods for calculating wind load on noise reducing devices have been harmonized to allow for the particular climatic conditions within each region.

As considerable differences existed in the methods of calculation used in different European countries, an effort has been made to define an acceptable level of performance by applying load factors to the basic load calculated to take account of its location. Limits are placed on deflections to avoid acoustic leakage either while the noise reducing device is being subjected to its design wind load or afterwards.

Adequacy of mechanical performance in fulfilling the structural criteria given in this annex is in general demonstrated by calculations taking into account the values of elastic limit, modulus of elasticity, and other factors relating to the materials employed in the construction. In cases where calculations are thought to be unreliable, tests are used to determine the resistance of the elements in the same arrangement as in the intended use of the noise reducing device.

The range of temperature over which performance is within acceptance criteria is determined to enable noise reducing devices to be appropriately specified for extreme conditions of heat or cold.

This annex specifies the mechanical requirements for noise reducing devices exposed to aerodynamic load, excepting the design of foundations. The method of calculating aerodynamic and static loads and the minimum mechanical requirements for structural and acoustical elements and fixing devices are given. Two sources of aerodynamic load are considered: firstly, wind forces and secondly, dynamic air pressure due to passing vehicles. The forces acting on noise absorbing cladding attached to supporting walls are also considered.

A.2 Aerodynamic load

A.2.1 General

Aerodynamic load shall be considered acting normal to the exposed surface of the noise reducing device.

NOTE Wind load and dynamic pressure due to vehicles can be assumed not to act simultaneously.

A.2.2 Design wind load

The design wind load shall be calculated in accordance with EN 1991-1-4, which is based on national maps showing basic wind speeds.

NOTE The calculations can also be carried out taking a basic wind speed from more precise data, using a return period of 50 years.

A.2.3 Dynamic effects due to vehicles

A.2.3.1 Dynamic pressure

For the standard cases a) to c), the following values of dynamic pressure (or suction) in Pascals, shall be used:

- a) traffic of vehicles in open air at a distance of 1 m from the noise reducing device and at a maximum speed of 100 km/h;