



SLOVENSKI STANDARD

SIST EN 1794-1:2018+AC:2019

01-februar-2019

Nadomešča:
SIST EN 1794-1:2018

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

Lärmschutzvorrichtungen 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 1794-1:2018+AC:2018**

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 1794-1:2018+AC:2019 en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1794-1:2018+AC:2019

<https://standards.iteh.ai/catalog/standards/sist/c8cbe5b3-ae91-4b74-b04e-aff5a9bf79f4/sist-en-1794-1-2018ac-2019>

EUROPEAN STANDARD

EN 1794-1:2018+AC

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

ICS 93.080.30

Supersedes EN 1794-1:2018

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

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

This European Standard was approved by CEN on 13 November 2017 and includes the Corrigendum issued by CEN on 19 December 2018.

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.

(standards.iteh.ai)

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.

<https://standards.iteh.ai/catalog/standards/sist/c8cbe5b3-ae91-4b74-b04e->

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Symbols and abbreviations	8
5 Performances	8
5.1 General.....	8
5.2 Wind load and load due to passing vehicles.....	8
5.3 Self-weight.....	9
5.4 Impact of stones.....	9
5.5 Safety in collision	9
5.6 Dynamic actions from snow clearance: equivalent static load.....	9
6 Test report.....	9
Annex A (normative) Resistance against wind load and load from passing vehicles	11
A.1 General.....	11
A.2 Assessment of the performance.....	11
A.2.1 Structural elements.....	11
A.2.2 Acoustic elements	11
A.2.2.1 General.....	11
A.2.2.2 Assessment by testing	12
A.2.3 Test report.....	14
A.2.4 Assessment of performance by calculation	15
A.3 Performance of structural elements.....	15
A.4 Performance of acoustic elements.....	16
A.5 Self-supporting elements	17
A.6 NOTE to Annex A – examples of protocol of measurement (informative).....	18
Annex B (normative) Self-weight	20
B.1 General.....	20
B.2 Determination of self-weight.....	20
B.2.1 Dry weight of acoustic elements.....	20
B.2.2 Wet weight of acoustic elements	20
B.2.3 Reduced wet weight	20
B.3 Mechanical requirements	20
B.3.1 Structural elements.....	20
B.3.2 Acoustic elements under their own weight.....	21

B.3.3	Combined weight, wind and other static loads	21
B.3.4	Fixing devices	21
B.4	Calculation and test reports	21
B.4.1	Assessment of performance by calculation	21
B.4.2	Assessment of performance by testing	22
Annex C	(normative) Impact of stones	23
C.1	General	23
C.2	Requirements	23
C.3	Test method	23
C.4	Test report	24
Annex D	(informative) Safety in collision	26
D.1	General	26
D.2	Testing and calculations	26
Annex E	(normative) Substitute load due to dynamic actions from snow clearance	27
E.1	General	27
E.2	Requirements	27
E.2.1	Magnitude and height of the load	27
E.2.2	Mechanical requirements	27
E.3	Methods of assessment	28
E.3.1	Calculations	28
E.3.2	Load test	28
E.4	Test report	28
Bibliography	30

ITeH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1794-1:2018+AC:2019
<https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-a15a7617914/sist-en-1794-1-2018ac-2019>

EN 1794-1:2018+AC:2018 (E)**European foreword**

This document (EN 1794-1:2018+AC:2018) 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 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 supersedes EN 1794-1:2018.

This document includes Corrigendum 1 to correct two symbols in A.4 a) 3) and A.4 b) 2).

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags **[AC]** **<AC]**.

The main change compared to the previous edition concerns:

- the Annex A, i.e.: the way to consider the resistance of the Noise Reducing Devices (NRD) to loads. The first version of this standard was written before the Eurocodes were published and, then, was specifying performances. This revised version of the standard now only states the methods of assessment of the maximum load the NRD can withstand without damage. Essentially the manufacturer now has the responsibility to declare the maximum load guarantee representative of its product performances, and to demonstrate those performances. On the other hand, facing previous problems with wrongly calculated performances of some acoustic elements, this new version of the standard requires that the assessment of the performances is now done mainly by testing.
- the Annex D: the acceptance criteria given in the previous version of this standard have been deleted and this revised version of the standard now only refers to EN 1317-1 and EN 1317-2.

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*
- *Part 3: Reaction to fire — Burning behaviour of noise reducing devices and classification*

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 1794-1:2018+AC:2019](https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-aff5a9bf79f4/sist-en-1794-1-2018ac-2019)

<https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-aff5a9bf79f4/sist-en-1794-1-2018ac-2019>

EN 1794-1:2018+AC:2018 (E)**1 Scope**

This European Standard specifies criteria to categorize 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 EN 1794-2.

This European Standard covers the current behaviour of the product. In order to assess its long term performances, EN 14389-2 should be used.

NOTE The test procedure described in Annex A doesn't consider the fatigue effect.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 1990, *Eurocode — Basis of structural design*

SIST EN 1794-1:2018+AC:2019

<https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-aff5a9bf79f4/sist-en-1794-1-2018ac-2019>

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1**noise reducing device****NRD**

device that is designed to reduce the propagation of traffic noise away from the road environment

Note 1 to entry: This may be a noise barrier, cladding, a road cover or an added device. These devices may include both acoustic and structural elements.

3.2**noise barrier**

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

3.3**acoustic element**

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

3.4**structural element**

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

3.5**cladding**

noise-reducing device, which is attached to a wall or other structure and reduces the amount of sound reflected

3.6**cover**

noise-reducing device, which either spans or overhangs the road

3.7**added device**

additional component that influences the acoustic performance of the original noise-reducing device (acting primarily on the diffracted energy)

3.8**mechanical test apparatus**

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

3.9**test area**

central area of a full size panel enclosed by a margin of 125 mm from each edge

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Note 1 to entry: As shown in Figure C.2.

[SIST EN 1794-1:2018+AC:2019](https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-caff5a9bf79f4/sist-en-1794-1-2018ac-2019)

3.10**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

<https://standards.iteh.ai/catalog/standards/sist/c8cbe5f3-ae91-4b74-b04e-caff5a9bf79f4/sist-en-1794-1-2018ac-2019>

3.11**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

3.12**dynamic actions from snow clearance: equivalent static 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

3.14**non-vertical noise barrier**

noise barrier or a part of it (e.g. cantilever) which has a vertical inclination more than 15°

3.15**maximum load**

maximum load (in kN/m²) that the sample can withstand with fulfilment of specified criteria

EN 1794-1:2018+AC:2018 (E)

4 Symbols and abbreviations

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

h	total height of the noise barrier, in millimetres
L	length of elements, in millimetres
L_S	bearing length of structural element, in millimetres
L_A	length of acoustic element, in millimetres
F_{safe}	maximum load the element can withstand, declared by the manufacturer and tested, in kN/m^2
F_{d50}	load that corresponds to a deflection of 50 mm, in kN/m^2
$F_{\text{permanent}L_A/500}$	load that corresponds to a permanent deflection of $L_A/500$, in kN/m^2
d	deflection, in millimetres
d_{hmax}	horizontal maximum deflection, in millimetres
d_{vmax}	vertical maximum deflection, in millimetres
$d_{\text{selfweight}}$	deflection of the sample in horizontal position under its own weight
d_{safe}	deflection after having applied the F_{safe} load
$d_{\text{permanent}}$	permanent deflection after charge
d_{50}	deflection of 50 mm
γ_G	partial factor for permanent actions, also accounting for model uncertainties and dimensional variations
γ_F	partial factor for actions, also accounting for model uncertainties and dimensional variations
γ	load factor
SF	safety factor

5 Performances

5.1 General

Under any of the loads specified in this Clause 5, elements shall not become detached from their supports or fixings may not fail.

The influence of inhomogeneity shall be considered in the relevant verifications according to the specific Eurocodes if existing.

All failure modes and deformation which may cause transient or permanent disorders should be considered. These modes can affect the overall behaviour of the structure or the behaviour of some elements.

5.2 Wind load and load due to passing vehicles

The manufacturer shall provide the result of the assessments done according the methods described in Annex A.

5.3 Self-weight

The manufacturer shall provide the dry and wet (or reduced wet) weight according to Annex B.

The manufacturer shall provide the vertical load the product can withstand under the self-weight, as calculated or tested in Annex B, in respect of the requirements specified in Annex B.

5.4 Impact of stones

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

5.5 Safety in collision

When the functions of noise barrier and safety barrier are integrated in one system, the safety in collision shall be assessed in accordance with EN 1317-1 and EN 1317-2. See also informative Annex D.

5.6 Dynamic actions from snow clearance: equivalent static load

The effects of dynamic forces from snow clearance shall be assessed in accordance with Annex E, where required or specified.

6 Test report

iTeh STANDARD PREVIEW
(standards.iteh.ai)

A test report shall be produced containing the aspects of performance and shall include the following information:

- a) number and year of this European Standard, i.e. EN 1794-1:2018;
<https://standards.iteh.ai/catalog/standards/sist/c8cbe5b-ae91-4b74-b04e-325b01463011/en-1794-1-2018>
- b) 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;
- 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.

NOTE Table 1 gives an example of the data which can be reported on the CE mark.

EN 1794-1:2018+AC:2018 (E)

Table 1 — Example of CE mark for characteristics evaluated according to this standard

Dry and reduced wet self-weight of an acoustic element:	
Dry weight:	0,70 kN
Reduced wet weight:	0,92 kN
Resistance to loads	
Structural elements	
Normal (90°) load due to wind, static, external and self-weight:	
Barrier height 3 m	5,2 kN/m
Barrier height 4 m	4,4 kN/m
Bending moment at ground level due to snow clearance:	15 kNm
Acoustic elements	
Maximum vertical load (Annex B, B.3.2):	150 kN/m
^a According to procedure a) Annex A	
F_{safe}	2,5 kN/m ²
d_{safe}	20 mm
d_{max} for $F_{\text{safe}} \cdot SF$, with $SF = 1,5$	30 mm
^b According to procedure b) Annex A	
F_{d50}	3,0 kN/m ²
d_{max} for $F_{d50} \cdot SF$, with $SF = 1,5$	60 mm
Normal (90°) load due to snow clearance the element can withstand:	14 kN
^a Test procedure when the sample under test cannot be charged up to a deflection of $d = 50$ mm.	
^b Test procedure when the sample under test can be charged up to a deflection of $d = 50$ mm.	