SLOVENSKI STANDARD
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Protihrupne ovire za cestni promet - Neakustične lastnosti - 2. del: Splošne zahteve za varnost in varovanje okolja

Road traffic noise reducing devices - Non-acoustic performance - Part 2: General safety and environmental requirements

Lärmschutzvorrichtungen an Straßen - Nichtakustische Eigenschaften - Teil 2: Allgemeine Sicherheits- und Umweltanforderungen

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Dispositifs de réduction du bruit du trafic routier - Performances non acoustiques - Partie 2 : Exigences générales pour la sécurité et l'environnement

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ICS:

13.020.99	Drugi standardi v zvezi z varstvom okolja	Other standards related to environmental protection
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

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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English Version

Road traffic noise reducing devices - Non-acoustic performance - Part 2: General safety and environmental requirements

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This European Standard was approved by CEN on 6 April 2020.

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European foreword

This document (EN 1794-2:2020) 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of an identical text or by endorsement, at the latest by November 2020, and conflicting national standards shall be withdrawn at the latest by November 2020.

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 1794-2:2011.

This series 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*

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The main change compared to the previous edition is:

— the suppression of the Annex A, resistance to brushwood fire moved into EN 1794-3.

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Introduction

While performing their primary function, road traffic noise reducing devices should not pose hazards to road users or other people in the vicinity or to the environment at large. Noise reducing devices should not reflect light in such a way as to prejudice road safety. They should be made from materials which do not emit noxious fumes or leachates as the result of natural or industrial processes, or as the result of fire. Noise reducing devices should allow a means of escape by road users and access by operatives in the event of an emergency or for maintenance.

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1 Scope

This document specifies methods and criteria for assessing the general safety and environmental performance of road traffic noise reducing devices under typical roadside conditions. Appropriate test methods are provided where these are necessary. The treatment of each topic is covered separately in Annexes A to E.

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 1794-1:2018, *Road traffic noise reducing devices - Non-acoustic performance - Part 1: Mechanical performance and stability requirements*

EN ISO 2813, *Paints and varnishes - Determination of gloss value at 20°, 60° and 85° (ISO 2813)*

3 Terms and definitions

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

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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 https://www.iso.org/obp

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3.1
noise reducing device
NRD
system designed to reduce the propagation of traffic noise away from the road environment

Note 1 to entry: The NRD comprises acoustic elements only or both structural and acoustic elements.

Note 2 to entry: applications of NRD include noise barriers, claddings, covers and added devices.

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 to reduce the amount of sound reflected

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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)

4 Symbols

ϕ_m	angle at which reflections from the surface of the transparent material obscure the view through the material, in degrees;
ϕ_0	angle between the visual axis and the normal to the noise reducing device (see Figure E.2), in degrees;
θ	angle of incidence
α_n	angle of transparency (see Figure E.2), in degrees;
α	angle (see Figure A.1)
β_n	angle of opacity (see Figure E.2), in degrees;
η	angle of the transparent Elements
μ	terms of refractive index
t_θ	function of the angle of incidence
K_A	visual acuity factor (see Figure E.3), in degrees;
k	Parameter
L_T	light transmission index (as determined in accordance with EN 410 or EN 2155-5), in percent;
$L_{T'}$	overall transparency for different material thickness t'
$L_T/100$	coefficient
r	radius (see Figure A.1)
S_O	area of opaque features within transparent elements, in square millimetres;
S_T	total area of transparent elements, including horizontal features, in square millimetres;
t/t'	material thickness/ different material thickness
T	transparency, in percent;
T_r	transparency looking right, in percent;
T_l	transparency looking left, in percent;
T_D	dynamic transparency, in percent;
T_S	static transparency, in percent.
u_i	estimated uncertainties
u_T	sum of the estimated combined uncertainties
u_T^2	the square of the uncertainty in T
w_i	weights

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5 Requirements

5.1 Secondary safety (falling debris)

When secondary safety has to be assessed, this shall be done in accordance with Annex A.

5.2 Environmental protection

The constituent materials and their breakdown products shall be identified in accordance with Annex B.

5.3 Means of escape in emergency

The acoustic and mechanical performances of doors or other means of escape shall be assessed in accordance with Annex C.

5.4 Reflection of light

The results of a standard test of reflectivity shall be assessed in accordance with Annex D.

5.5 Transparency

The results of a standard test of transparency should be assessed in accordance with Annex E.

6 Test report

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

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a) number and year of this European Standard;

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 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)

Secondary safety: danger of falling debris

A.1 General

Noise reducing devices can be mounted on structures or in such a way that if damaged they could pose a hazard to road users or to others. In particular, even if the noise reducing device is protected by the safety system on an elevated structure, there is a possibility of pieces or whole panels from a noise barrier becoming detached as the result of a violent collision and for the debris to fall, endangering those below.

Noise reducing devices which are to be used in a vulnerable position may be required to be restrained by internal or external linkage between panels and/or elements to prevent them from becoming detached and falling.

The standard provides some general indications of factors which need to be considered and also provides a method of establishing the resistance of a product to a severe blow.

NOTE It is principally the responsibility of specifiers to consider the potential consequences of a barrier becoming damaged and to provide protection accordingly.

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Alternatively, a means of catching falling pieces detached from vulnerable barriers may be specified for barrier systems which are not so restrained.

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A.2 Requirements

A.2.1 Behaviour under impact

Where it is known that any component of a device is liable to shatter if struck or shocked, this shall be clearly stated.

NOTE Such a statement can be qualified by further evidence of the effectiveness of any restraining mechanism.

A.2.2 Fastening of structural and acoustical elements

A.2.2.1 A noise reducing device shall be assumed to be safety fastened if the elements are secured in such a way that they do not fall when they are deformed or broken. The restraint systems shall be designed to withstand the self-weight of the relevant falling parts, multiplied by a load factor of 4. The wet self-weight shall be used, calculated in accordance with EN 1794-1:2018, Annex B.

A.2.2.2 If structural and acoustical elements of this category of noise reducing device are prevented from falling by a system of restraint linking them together, each link shall take the load of all adjoining elements. It shall be assumed that the load applied by broken pieces of a device is the weight of a single element acting at the most unfavourable position on the restraint system.

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A.3 Test method

NOTE This is the test method to access the characteristics of the falling debris produced by fixed energy impacts.

A.3.1 Principle

The method of testing is to cause a heavy mass to strike normally to the centre or the most sensitive point of the test specimen or other tested element or system, so that the test specimen is destroyed or pushed out of the holding structure, or, alternatively to show its behaviour during the test.

A.3.2 Test equipment

The test equipment comprises:

— impactor;

— structure holding the test specimen;

— structure used to produce the impact;

— high speed video camera to record the test.

A.3.3 Impactor

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The impactor consists of a rotation symmetrical full steel double cone.

The impactor shall conform to the shape and details shown in Figure A.1 and the relation to their impact energy in Figure A.2.

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A.3.4 Test specimen

The test specimen shall be assembled in the supporting structure in the way intended by the manufacturer, including: dimensions, fixings, seals and any connecting systems. Elements or systems with integrated or attached restraint structure shall be tested as complete units.

A.3.5 Structure holding the test specimen

The structure holding the test specimen shall be designed to be able to withstand the whole impact energy as described in A.3.7. In all cases the structure shall allow a good camera position for proper documentation.

A.3.6 Structure used to produce the impact

The impact shall be produced by a pendulum. The impactor shall swing on 2 wires fixed on 2 points above the structure holding the test sample as shown in Figure A.2. In order to reach the impact energy of 6,0 kJ, the height of the fall of the impactor with 400 kg shall be 1,50 m, corresponding to a speed of 19,5 km/h. In order to reach the impact energy of 0,5 kJ, the height of the fall of the impactor with 45 kg shall be 1,10 m, corresponding to a speed of 16,7 km/h. The radius of the pendulum shall be minimum 4,0 m in both cases.

A.3.7 Evaluation

A.3.7.1 General

Only the falling debris caused by the first impact shall be taken into account. The performance shall be expressed as a level according to Table A.1.

NOTE This can be achieved for example by restraining the pendulum after the first impact or by proper analysis of the video documentation.