SLOVENSKI STANDARD
SIST EN ISO 3095:2013

01-oktober-2013

Nadomešča:
SIST EN ISO 3095:2005

Akustika - Železniške naprave - Merjenje hrupa, ki ga oddajajo tirna vozila (ISO 3095:2013)

Acoustics - Railway applications - Measurement of noise emitted by railbound vehicles (ISO 3095:2013)

Bahnanwendungen - Akustik - Messung der Geräuschemission von spurgebundenen Fahrzeugen (ISO 3095:2013)

Acoustique - Applications ferroviaires - Mesurage du bruit émis par les véhicules circulant sur rails (ISO 3095:2013)

Ta slovenski standard je istoveten z: **EN ISO 3095:2013**

ICS:

17.140.30	Emisija hrupa transportnih sredstev	Noise emitted by means of transport
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

SIST EN ISO 3095:2013 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3095

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Supersedes EN ISO 3095:2005

English Version

Acoustics - Railway applications - Measurement of noise emitted by railbound vehicles (ISO 3095:2013)

Acoustique - Applications ferroviaires - Mesurage du bruit émis par les véhicules circulant sur rails (ISO 3095:2013)

Bahnanwendungen - Akustik - Messung der Geräuschemission von spurgebundenen Fahrzeugen (ISO 3095:2013)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN ISO 3095:2013) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 43 "Acoustics".

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of an identical text or by endorsement, at the latest by February 2014, and conflicting national standards shall be withdrawn at the latest by February 2014.

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This document supersedes EN ISO 3095:2005.

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INTERNATIONAL STANDARD

ISO 3095

Third edition
2013-08-01

Acoustics — Railway applications — Measurement of noise emitted by railbound vehicles

Acoustique — Applications ferroviaires — Mesurage du bruit émis par les véhicules circulant sur rails

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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The committee responsible for this document is the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 3095:2005), which has been technically revised.

Introduction

Railway exterior noise is encountered both along open track and in and around depots, stops, stations and other holding locations. It includes a number of different physical sources such as rolling noise, impact noise, traction noise, aerodynamic noise, curving noise, braking noise, horn noise and noise from auxiliary equipment and other components. The noise for any given train type strongly depends on the rolling stock design, operating conditions and the track type and condition.

Rolling noise is one of the main sources which contain a significant and sometimes dominant noise contribution from the track. This International Standard is intended to characterize the noise emission from the unit, minimizing the influence of the track.

Acoustics — Railway applications — Measurement of noise emitted by railbound vehicles

1 Scope

This International Standard specifies measurement methods and conditions to obtain reproducible and comparable exterior noise emission levels and spectra for all kinds of vehicles operating on rails or other types of fixed track, hereinafter conventionally called "unit".

This International Standard is applicable to type testing of units. It does not include all the instructions to characterize the noise emission of the other infrastructure related sources (bridges, crossings, switching, impact noise, curving noise, etc.).

This International Standard is not applicable to:

— the noise emission of track maintenance units while working;

— environmental impact assessment;

— noise immission assessment;

— guided buses;

— warning signal noise.

The results may be used, for example:

— to characterize the exterior noise emitted by units;

— to compare the noise emission of various units on a particular track section;

— to collect basic source data for units.

NOTE 1 The type testing procedures specified in this International Standard are of engineering grade (grade 2), that is the preferred one for noise declaration purposes, as defined in ISO 12001. If test conditions (e.g. vehicle and/or track conditions, measuring conditions) are relaxed (e.g. as done for trackside monitoring of in-service trains), then the results are no longer of engineering grade.

NOTE 2 The procedures specified for accelerating and decelerating tests are of survey grade, see ISO 12001.

NOTE 3 Additional guidance is provided in Annex D for measurements in the specific case of light rail vehicles.

2 Normative references

The following referenced 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.

IEC 60942:2003, *Electroacoustics — Sound calibrators*

IEC 61260:1995, *Electroacoustics — Octave-band and fractional-octave-band filters*

IEC 61260:1995/Amd. 1:2001, *Electroacoustics — Octave-band and fractional-octave-band filters — Amendment 1*

IEC 61672-1:2002, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 61672-2:2003, *Electroacoustics — Sound level meters — Part 2: Pattern evaluation tests*

EN 15461:2011, *Railway applications — Noise emission — Characterization of the dynamic properties of track sections for pass by noise measurements (includes Amdendment 1:2010)*

EN 15610:2009, *Railway applications — Noise emission — Rail roughness measurement related to rolling noise generation*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

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

3.1
train
single vehicle or a number of coupled vehicles/units operating on a guided ground transport system

Note 1 to entry: See Table 1.

Table 1 — Definitions of rolling stock formations

Articulated	Non-articulated
Vehicle - see unit. Unit - minimum operational formation of articulated cars.	Vehicle - any single car on its running gear. Unit - minimum operational formation comprising of one or more vehicles coupled together.
Train - refers to any formation which may operate in service, it may comprise of one or more units coupled together.	Train - refers to any formation which may operate in-service, may be either a single unit or one or more units coupled together.

[SOURCE: EN 13452-1:2003]

3.2
car
single non-articulated element of a railbound vehicle or unit

3.3
type test for noise emission of railbound units
one or more tests performed to prove that a product is capable of conforming to all relevant requirements of a specification

[SOURCE: ISO 12576-1:2001, 3.27, modified — for noise emission of railbound units has been added.]

3.4
environmental impact assessment test
measurement performed for collecting data to be used in a prediction method for environmental assessment

3.5
acoustic rail roughness
r(x)
variation of the height of the rail running surface associated with rolling noise excitation, expressed as a function of distance *x* along the rail

Note 1 to entry: Acoustic rail roughness is expressed in µm.

[SOURCE: EN 15610:2009]

3.6
acoustic roughness spectrum
$\tilde{r}(\lambda)$
amplitude of the acoustic roughness expressed as a function of the wavelength λ

Note 1 to entry: Acoustic roughness spectrum is expressed in µm and usually presented in terms of acoustic roughness level $\tilde{L}_r$ in dB re 1 µm.

[SOURCE: EN 15610:2009]

3.7
track decay rate
rate of attenuation of vibration amplitude of either vertical or lateral bending wave motion in the rail as a function of the distance along the rail

Note 1 to entry: It is represented by a one-third octave spectrum of values expressed in decibels per metre (dB/m) representing attenuation over distance.

[SOURCE: EN 15461:2011 and Amd. 1:2010]

3.8
test section
specific section of track associated with a particular set of measurements

[SOURCE: EN 15610:2009]

3.9
reference track section

portion of track on which the track decay rates and the acoustic roughness levels are controlled

3.10

sound pressure
p
difference between instantaneous total pressure and static pressure

Note 1 to entry: The quantity refers also to the rms value.

[SOURCE: ISO 80000-8:2007]

3.11
sound pressure level
L_p

$$L_p = 10 \lg \left(\frac{p}{p_0} \right)^2 \text{ dB}$$

where p is the sound pressure and the reference value in airborne acoustics is p_0 = 20 µPa.

Note 1 to entry: Because of practical limitations of the measuring instruments, p^2 is always understood to denote the square of a frequency-weighted, frequency-band-limited or time weighted sound pressure or both. If specific frequency and time weightings, as specified in IEC 61672-1:2002, or specific frequency bands or both are applied, this should be indicated by appropriate subscripts.

[SOURCE: ISO 80000-8:2007, modified — year added to IEC 61672-1 in Note 1 to entry]

3.12
AF-weighted sound pressure level history
$L_{p\mathrm{AF}}(t)$
A-weighted sound pressure level as a function of time with time weighting F (fast)