ICS 17.140.30, 45.060.01 SLOVENSKÁ TECHNICKÁ NORMA September 2026

STN	**Železnice Akustika Meranie hluku emitovaného koľajovými vozidlami (ISO 3095: 2025, opravená verzia 2026-05)**	**STN EN ISO 3095** 28 2250

Railway applications - Acoustics - Measurement of noise emitted by railbound vehicles (ISO 3095:2025, Corrected version 2026-05)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/26

Obsahuje: EN ISO 3095:2025, ISO 3095 Corrected version 2026-05:2025

Oznámením tejto normy sa ruší
STN EN ISO 3095 (28 2250) z januára 2026

143017

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2026
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii v znení neskorších predpisov.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 3095

September 2025

ICS 17.140.30; 45.060.01

Supersedes EN ISO 3095:2013

English Version

Railway applications - Acoustics - Measurement of noise emitted by railbound vehicles (ISO 3095:2025, Corrected version 2026-05)

Applications ferroviaires - Acoustique - Mesurage du bruit émis par les véhicules circulant sur rails (ISO 3095:2025, Version corrigée 2026-05)

Bahnanwendungen - Akustik - Messung der Geräuschemission von spurgebundenen Fahrzeugen (ISO 3095:2025, korrigierte Fassung 2026-05)

This European Standard was approved by CEN on 1 September 2025.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 10 June 2026.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye 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

© 2025 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN ISO 3095:2025 E

Contents

Page

European foreword **3**

European foreword

This document (EN ISO 3095:2025) has been prepared by Technical Committee ISO/TC 43 "Acoustics" in collaboration with Technical Committee CEN/TC 256 “Railway applications” the secretariat of which is held by DIN.

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 March 2026, and conflicting national standards shall be withdrawn at the latest by March 2026.

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 ISO 3095:2013.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 3095:2025 , Corrected version 2026-05 has been approved by CEN as EN ISO 3095:2025 without any modification.

International Standard

ISO 3095

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

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

Fourth edition 2025-09

Corrected version 2026-05

Reference number
ISO 3095:2025(en)

© ISO 2025

COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **vi**

Introduction ..... **vii**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **2**
3.1 General definitions 2
3.2 Definitions of track properties 3
3.3 Definitions of acoustic measurement quantities 4
3.4 Definitions for noise from parked trains 6

4 Instrumentation and calibration **6**
4.1 Instrumentation 6
4.2 Calibration 7

5 Stationary test **7**
5.1 General 7
5.2 Environmental conditions 7
5.2.1 Acoustical environment 7
5.2.2 Meteorological conditions 8
5.2.3 Background sound pressure level 8
5.3 Track conditions 8
5.4 Vehicle conditions 9
5.4.1 General 9
5.4.2 Normal operating conditions 9
5.4.3 Additional operating conditions 10
5.5 Measurement positions 10
5.5.1 Standard measurement positions 10
5.5.2 Additional measurement positions 11
5.6 Measured quantities 11
5.7 Test procedure 11
5.8 Data processing 12
5.8.1 Standard processing 12
5.8.2 Additional processing 12

6 Constant speed test **13**
6.1 Environmental conditions 13
6.1.1 Acoustical environment 13
6.1.2 Meteorological conditions 14
6.1.3 Background sound pressure level 14
6.2 Track conditions 14
6.2.1 General 14
6.2.2 Geometry of the line 14
6.2.3 Track superstructure 15
6.2.4 Track quality 15
6.2.5 Acoustic rail roughness of the test track 15
6.2.6 Dynamic properties of the test track 16
6.2.7 Special conditions 17
6.3 Vehicle conditions 17
6.3.1 General 17
6.3.2 Normal operating conditions 18
6.3.3 Occupancy and load 18
6.3.4 Wheel tread conditioning 19
6.3.5 Train composition (adjacent vehicles) 19
6.4 Measurement positions 20
6.4.1 Standard measurement positions 20
6.4.2 Additional measurement positions 21

© ISO 2025 – All rights reserved

6.5 Measured quantities 21
6.6 Test procedure 21
6.6.1 General 21
6.6.2 Pass-by speeds 21
6.6.3 Recording and measurement time intervals 21
6.7 Data processing 24
6.7.1 Standard processing 24
6.7.2 Additional processing 24

7 Acceleration test from standstill 24
7.1 General 24
7.2 Environmental conditions 25
7.2.1 Acoustical environment 25
7.2.2 Meteorological conditions 25
7.2.3 Background sound pressure level 25
7.3 Track conditions 25
7.4 Vehicle conditions 26
7.4.1 General 26
7.4.2 Normal operating conditions 27
7.4.3 Occupancy and load 27
7.5 Maximum level method 27
7.5.1 Measurement positions 27
7.5.2 Measured quantities 29
7.5.3 Test procedure 30
7.5.4 Data processing 30
7.6 Averaged level method 30
7.6.1 Measurement positions 30
7.6.2 Measurement quantity 31
7.6.3 Test procedure 31
7.6.4 Data processing 31

8 Braking test 32
8.1 General 32
8.2 Environmental conditions 32
8.2.1 Acoustical environment 32
8.2.2 Meteorological conditions 32
8.2.3 Background sound pressure level 32
8.3 Track conditions 33
8.4 Vehicle conditions 33
8.4.1 General 33
8.4.2 Normal operating conditions 34
8.4.3 Occupancy and load 34
8.4.4 Braking modes 34
8.5 Measurement positions 34
8.6 Measurement quantity 35
8.7 Test procedure 35
8.8 Data processing 35
8.8.1 Standard processing 35
8.8.2 Additional processing 36

9 Quality of the measurements 36
9.1 General 36
9.2 Deviations from the requirements 36
9.3 Measurement tolerances 36
9.4 Measurement spread 36
9.5 Measurement uncertainties 36

10 Test report 37

Annex A (normative) **Method to characterize the impulsive character of the noise 38**

Annex B (normative) **Tests at constant speed — Special cases 41**

© ISO 2025 – All rights reserved

Annex C (informative) **Track influence on the pass-by test result** 45

Annex D (normative) **Method to assess acceptable small deviations from acoustic rail roughness requirements** 61

Annex E (informative) **Guidance for urban rail vehicles measurement** 63

Annex F (informative) **Additional measurements** 65

Annex G (informative) **Quantification of measurement uncertainties according to ISO/IEC Guide 98-3:2008**[1] 71

Annex H (informative) **Noise from parked trains** 76

Annex I (informative) **Data processing for tonal noise assessment at standstill** 86

Bibliography 89

© ISO 2025 – All rights reserved

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 document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*,in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 256, *Railway applications*,in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 3095:2013), which has been technically revised.

The main changes are as follows:

— the alignment of measurement conditions with ISO 3381:2021[6];

— an improvement of the tonality assessment;

— the introduction of specific measurement conditions for hybrid vehicles;

— a new informative Annex C providing guidance information on the track influence on pass-by test results;

— an improved specification for additional noise measurements on bridges and other elevated structures in concrete bridge sections (see Annex F);

— a new informative Annex H specifying the measurement method for noise from parked trains to support a potential regulation aiming at taking into account annoyance produced in that situation;

— a new informative Annex I outlining a procedure for assessing tonal noise using a narrow band analysis at standstill.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 3095:2025 incorporates the following correction:

— In the last sentence of 6.3.4, the value "4 kPa" was corrected into "400 kPa".

© ISO 2025 – All rights reserved

Introduction

Railway exterior noise is encountered both along open tracks and in and around depots, stops, stations and other holding locations. It includes a number of different physical sources such as rolling noise,[20][28][29][30] 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 from vehicle running on open tracks. It contains a significant and sometimes dominant noise contribution from the track. This document is intended to characterize the noise emission from the unit, minimizing the influence of the track.

These conditions are relevant for type testing of rollingstock, enabling comparisons of rolling stock noise emission levels for train operating and test conditions to comply with regulatory or contractual sound level limits. Where measurements are undertaken on other track designs or with different rolling stock operating conditions, noise levels can differ from the type test conditions described herein.

When project proponents are specifying project noise limits for rolling stock, they should include consideration of what is appropriate to their network/environment, temperature ranges, track type (ballast/slab/tunnel, light rail, etc.), and note that the limit values will be dependent on the network conditions, track decay rates, wheel/rail maintenance expectations, speed range, curves, and so on.

Railway environments carry particular safety risks. The measurement procedures specified in this document need to take into account relevant safe work methods applicable to each network.

© ISO 2025 – All rights reserved

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

1 Scope

This document 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 document is applicable to type testing of units.

It provides measurement procedures for vehicle exterior noise (in general, a vehicle type test is carried out using only a selected subset of these tests):

— when the vehicle is moving at constant speed;

— when the vehicle is accelerating or decelerating;

— when the vehicle is stationary in different operating conditions.

It does not include all the instructions to characterize the noise emission of the infrastructure related sources (bridges, crossings, switching, impact noise, curving noise, etc.).

This document does not apply to

— the noise emission of track maintenance units while working,

— environmental impact assessment (collection of data to be used in a prediction method for environmental assessment),

— noise immission assessment,

— guided buses, and

— warning signal noise.

The results can 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, and

— to collect basic source data for units.

NOTE Additional guidance is provided in Annex E for measurements in the specific case of urban rail vehicles.

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.

IEC 60942:2017, *Electroacoustics — Sound calibrators*

IEC 61094-4:1995, *Measurement microphones — Part 4: Specifications for working standard microphones*

IEC 61260-1:2014, *Electroacoustics — Octave-band and fractional-octave-band filters — Part 1: Specifications*

© ISO 2025 – All rights reserved

IEC 61260-3:2016, *Electroacoustics — Octave-band and fractional-octave-band filters — Part 3: Periodic tests*

IEC 61672-1:2013, *Electroacoustics — Sound level meters — Part 1: Specifications*

IEC 61672-3:2013, *Electroacoustics — Sound level meters — Part 3: Periodic tests*

ISO 1996-2:2017, *Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of sound pressure levels*

EN 15461:2008+A1:2010, *Railway applications — Noise emission — Characterisation of the dynamic properties of track sections for pass by noise measurements*

EN 15610:2019+A1:2025, *Railway applications — Acoustics — Rail and wheel roughness measurement related to rolling noise generation*

EN 17343:2023, *Railway applications — General terms and definitions*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN