SLOVENSKI STANDARD
SIST EN IEC 61373:2026

01-november-2026

Železniške naprave - Oprema tirnih vozil - Preskusi na udarce in vibracije

Railway applications - Rolling stock equipment - Shock and vibration tests

Bahnanwendungen – Betriebsmittel von Bahnfahrzeugen – Prüfungen für Schwingen und Schocken

Applications ferroviaires - Matériel roulant - Essais de chocs et vibrations

Ta slovenski standard je istoveten z: **EN IEC 61373:2026**

ICS:

17.160	Vibracije, meritve udarcev in vibracij	Vibrations, shock and vibration measurements
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

SIST EN IEC 61373:2026 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61373

September 2026

ICS 45.060.01

Supersedes EN 61373:2010; EN 61373:2010/AC:2017-09

English Version

Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373:2026)

Applications ferroviaires - Matériel roulant - Essais de chocs et vibrations (IEC 61373:2026)

Bahnanwendungen - Betriebsmittel von Bahnfahrzeugen - Prüfungen für Schwingen und Schocken (IEC 61373:2026)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

Ref. No. EN IEC 61373:2026 E

European foreword

The text of document 9/3266/FDIS, future edition 3 of IEC 61373, prepared by TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61373:2026.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2027-09-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2029-09-30

This document supersedes EN 61373:2010 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of the International Standard IEC 61373:2026 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-47	-	Environmental testing - Part 2-47: Test - Mounting of specimens for vibration, impact and similar dynamic tests	EN 60068-2-47	-
IEC 60068-2-64	2008	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance	EN 60068-2-64	2008
+ A1	2019		+ A1	2019
ISO 3534-1	-	Statistics - Vocabulary and symbols – Part 1: General statistical terms and terms used in probability	-	-

IEC 61373

Edition 3.0 2026-07

INTERNATIONAL STANDARD

Railway applications - Rolling stock equipment - Shock and vibration tests

ICS 45.060.01

ISBN 978-2-8327-1205-4

IEC 61373:2026-07(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Railway applications - Rolling stock equipment - Shock and vibration tests

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 61373 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) consideration of specific *ASD* spectra from onboard measurements and certification limited to the specific case;
b) exclusion from the scope of applicability of traction motors and any substructure not equipped with electrical, electronic or pneumatic device;
c) clarification for order of testing and typical test sequence, taking into account the possibility of simultaneous multi-axis testing;

d) recommendation and guidance for removing resilient mounts of the equipment (if located between the equipment and the main structure) during the long-life test;

e) qualification of the fixture device used to attach the equipment to the test bench;

f) guidance for using a measuring point as a possibility to assess mechanical integrity;

g) change of the method to calculate the acceleration ratio which shall be applied to the functional ASD value to obtain the simulated long-life ASD value;

h) duration of long-life test can be set from 5 h to 100 h per axis, with corresponding acceleration ratio (default value) indicated in a table;

i) clarification of the concept of structural integrity;

j) description of test exemption cases, subassembly tests, and finite element analysis for structural parts of equipment (new Annex E);

k) the lowest frequency f_1 of ASD spectra of Category 1 and Category 2 is fixed at 5 Hz as a default value, and the lowest frequency f_1 of ASD spectra of Category 3 is fixed at 10 Hz as a default value;

l) update of ASD spectra for functional random vibration test: Table 1, Table 2, Table 3, Table 4, Table A.2 and Figure 6, Figure 7, Figure 8, Figure 10. This update was recommended in the Rail Safety and Standard Board research program document: “Vibration environment for rail vehicle mounted Equipment”;

m) new annex F dedicated on urban vehicle operating on pneumatic tyres.

The text of this International Standard is based on the following documents:

Draft	Report on voting
9/3266/FDIS	9/3321/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

This document covers the requirements for random vibration and shock testing items of pneumatic, electrical and electronic equipment or components (hereinafter only referred to as equipment) to be fitted on to railway vehicles. Random vibration and shock is the only method to be used for equipment or component approval.

The tests contained within this document are specifically aimed at demonstrating the ability of the equipment under test to withstand the type of environmental vibration conditions normally expected for railway vehicles. In order to achieve the best representation possible, the values quoted in this document have been derived from actual service measurements submitted by various contributing bodies from around the world.

This document is not intended to cover self-induced vibrations as these will be specific to particular applications.

Engineering judgement and experience are recommended in the execution and interpretation of this document.

This document is suitable for design and validation purposes; however, it does not exclude the use of other development tools (such as sine sweep), which can be used to ensure a predetermined degree of mechanical and operational confidence. The test levels to be applied to the equipment under test are dictated only by its location on the train (i.e. axle, bogie or body-mounted).

It should be noted that these tests can be performed on prototypes in order to gain design information about the product performance under random vibration. However, for test certification purposes, the tests are carried out on equipment taken from normal production.

The procedures and requirements defined in this document do not substitute or overrule any structural assessment required from other structural requirement standards. This document is not intended to be used as a proof of fatigue strength.

NOTE European Standards EN 12663 and EN 13749 are examples of such structural requirement standards.

1 Scope

This document specifies the requirements for testing items of equipment intended for use on railway vehicles which are subsequently subjected to vibrations and shock owing to the nature of railway operational environment. To gain assurance that the quality of the equipment is acceptable, it is exposed to tests of reasonable duration that simulate the service conditions seen throughout its expected life.

Simulated long-life testing can be achieved in a number of ways each having their associated advantages and disadvantages, the following being the most common:

a) amplification: where the amplitudes are increased and the time base decreased;

b) time compression: where the amplitude history is retained and the time base is decreased (increase of the frequency);

c) decimation: where time slices of the historical data are removed when the amplitudes are below a specified threshold value.

The amplification method as stated in item a) above, is used in this document and together with the publications referred to in Clause 2; it defines the default test procedure to be followed when vibration testing items for use on railway vehicles.

Whilst this document is primarily concerned with railway vehicles on fixed rail systems, its wider use is not precluded. For systems operating on pneumatic tyres, or other transportation systems such as trolleybuses, where the level of shock and vibration clearly differ from those obtained on fixed rail systems, specific test levels can be considered. In that case, the frequency spectra and the shock duration and amplitude are computed in compliance with the guidelines in Annex A.

Annex F provides the functional random vibration load that can be considered by the user for urban vehicles operating on pneumatic tyres.

This document applies to single axis testing. However, multi-axis testing is possible.

The anchoring bolts at the fixing point(s) of the equipment are not evaluated in this document.

This document is intended to evaluate equipment which is attached to the main structure of the vehicle (and components mounted thereon). It is not intended to test equipment which forms part of the main structure. Main structure in the sense of this document means car body, bogie and axle.

The following items are out of scope of this document:

– the traction motors for railway vehicles;

– any mechanical substructure not equipped with electrical, electronic or pneumatic component.

Additional or special vibration tests for some specific equipment are not specified in this document, for example:

a) equipment mounted on, or linked to, items which are known to produce defined frequency excitation;

b) equipment such as pantographs, shoegear, or suspension components which are known to be exposed to specific shock and vibration excitation;

c) equipment intended for use in special operational environments as specified by the customer;

d) transportation and handling tests.

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 60068-2-27, *Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock*

IEC 60068-2-47, *Environmental testing - Part 2-47: Test - Mounting of specimens for vibration, impact and similar dynamic tests*

IEC 60068-2-64:2008, *Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance*
IEC 60068-2-64:2008/AMD1:2019

ISO 3534-1, *Statistics - Vocabulary and symbols - Part 1: General statistical terms and terms used in probability*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60068-2-64, ISO 3534-1 and the following apply.

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

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
random vibration
vibration the instantaneous value of which cannot be precisely predicted for any given instant of time

3.1.2
Gaussian distribution
continuous distribution with probability density function equal to:

$$P_x(x) = \frac{1}{\sigma \sqrt{2 \times \pi}} \times e^{\frac{-(x-\bar{x})^2}{2 \times \sigma^2}}$$

where

σ is the standard deviation;

x is the instantaneous value;

$\bar{x}$ is the mean value of x.

Note 1 to entry: See Figure 1.