IEC 61133

Edition 3.0 2016-02
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Railway applications – Rolling stock – Testing of rolling stock on completion of construction and before entry into service

IEC 61133:2016-02 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

IEC 61133

Edition 3.0 2016-02
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Railway applications – Rolling stock – Testing of rolling stock on completion of construction and before entry into service

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 45.060

ISBN 978-2-8322-3217-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

RAILWAY APPLICATIONS – ROLLING STOCK – TESTING OF ROLLING STOCK ON COMPLETION OF CONSTRUCTION AND BEFORE ENTRY INTO SERVICE

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61133 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This standard is derived from EN 50215.

This third edition cancels and replaces the second edition, published in 2006; it constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

- References to standards other than international have been removed from the main text so the notes refer solely to Annex B;
- Annex B has been updated with the latest European information, and cross-references between the TSIs and ENs and the clauses of IEC 61133 have been added.

The text of this standard is based on the the second edition and the following documents:

FDIS	Report on voting
9/2096/FDIS	9/2132/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

RAILWAY APPLICATIONS – ROLLING STOCK – TESTING OF ROLLING STOCK ON COMPLETION OF CONSTRUCTION AND BEFORE ENTRY INTO SERVICE

1 Scope

This International Standard specifies general criteria to demonstrate by testing that newly constructed complete railway vehicles conform with standards or other normative documents.

This International Standard, as a whole or in part, applies to all railway vehicles except special purpose vehicles such as track-laying machines, ballast cleaners and personnel carriers. The extent of application of the standard for particular vehicles will be specifically mentioned in the contract, to take account, where necessary, of any legislative requirements.

NOTE 1 The parts of the standard which are applicable will depend on the type of vehicle (e.g. passenger, freight, powered trailer, etc.).

NOTE 2 The scope of this standard excludes railbound and road/rail vehicles for construction and maintenance of railway infrastructure.

NOTE 3 This standard does not deal with tests carried out on components or equipment before fitting to the vehicle.

In so far as this International Standard is applicable, it may be used for the following:

– generator sets mounted on a vehicle provided for auxiliary purposes;
– electrical transmission used on trolley buses or similar vehicles;
– control and auxiliary equipment of vehicles with non-electrical propulsion systems;
– vehicles guided, supported or electrically propelled by systems which do not use the adhesion between wheel and rail.

NOTE 4 Specific technical requirements apply to vehicles which operate on the railways in the European Union. The source of those requirements is given in Annex B. Where a European requirement applies to a given clause, a note has been inserted at the end of the clause.

2 Normative references

The following 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 60077 (all parts), *Railway applications – Electric equipment for rolling stock*

IEC 60310:~~2004~~ 2015, *Railway applications – Traction transformers and inductors on board rolling stock*

IEC 60322:2001, *Railway applications – Electric equipment for rolling stock – Rules for power resistors of open construction*

IEC 60349 (all parts), *Electric traction – Rotating electrical machines for rail and road*

~~IEC 60349-1:2002, *Electric traction – Rotating electrical machines for rail and road vehicles – Part 1: Machines other than electronic convertor-fed alternating current motors*~~

~~IEC 60349-2:2002, *Electric traction – Rotating electrical machines for rail and road vehicles – Part 2: Electronic convertor-fed alternating current motors*~~

IEC 60494-1:~~2002~~ 2013, *Railway applications – Rolling stock – Pantographs – Characteristics and tests – Part 1: Pantographs for main line vehicles*

IEC 60494-2:~~2002~~ 2013, *Railway applications – Rolling stock – Pantographs – Characteristics and tests – Part 2: Pantographs for metros and light rail vehicles*

IEC 60529:~~2001~~ 1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60571:~~1998~~ 2012, *Railway applications – Electronic equipment used on ~~rail vehicles~~ rolling stock*

IEC 60850:~~2000~~ 2014, *Railway applications – Supply voltages of traction systems*

IEC 61287 (all parts), *Railway applications – Power convertors installed on board rolling stock*

~~IEC 61287-1:2005, *Railway applications – Power convertors installed on board rolling stock – Part 1: Characteristics and test methods*~~

IEC 61377-1~~:2006~~, *Railway applications – Rolling stock – Part 1: Combined testing of inverter-fed alternating current motors and their control system*

IEC 61377-2~~:2002~~, *Railway applications – Rolling stock – Combined testing – Part 2: Chopper-fed direct current traction motors and their control*

IEC 61377-3~~:2002~~, *Railway applications – Rolling stock – Part 3: Combined testing of alternating current motors, fed by an indirect converter, and their control system*

IEC 61991:2000, *Railway applications – Rolling stock – Protective provisions against electrical hazards*

IEC 62236-3-1:~~2003~~ 2008, *Railway applications – Electromagnetic compatibility – Part 3-1: Rolling stock – Train and complete vehicle*

IEC 62236-3-2:~~2003~~ 2008, *Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus*

IEC 62278:2002, *Railway applications – Specification and demonstration of reliability, availability, maintainability and safety (RAMS)*

IEC 62313:2009, *Railway applications – Power supply and rolling stock – Technical criteria for the coordination between power supply (substation) and rolling stock*

IEC 62425, *Railway applications – Communication, signalling and processing systems – Safety related electronic systems for signalling* ~~[1]~~

IEC 62427:2007, *Railway applications – Compatibility between rolling stock and train detection systems*

IEC 62845, *Railway applications – Radio remote control system of traction vehicles for shunting application*

~~[1] To be published.~~

IEC 62846, *Railway applications – Current collection systems – Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*[2]

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

ISO 3095~~:2005~~, *Acoustics – Railway applications – Measurement of noise emitted by railbound vehicles*

ISO 3381~~:2005~~, *Railway applications – Acoustics – Measurement of noise inside ~~rail~~ railbound vehicles*

ISO 9001:2015, *Quality management systems – Requirements*

NOTE For applications in the European Union, see also the references in Annex B.

~~UIC Leaflet 623-1: 3rd Edition, 2005, *Approval procedures for the diesel engines of motive power units*~~

~~UIC Leaflet 623-2: 3rd Edition, 2005, *Approval tests for the diesel engines of motive power units*~~

~~UIC Leaflet 623-3: 3rd Edition, 2003, *Series test and acceptance conditions for diesel engines of motive power units*~~

3 Terms, definitions and abbreviations

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

3.1
a.c.
alternating current

3.2
approval authority
any body other than the purchaser with the legal right to require tests to be performed on vehicles within the scope of this standard and to whom compliance verification ~~must~~ is demonstrated

Note 1 to entry: These bodies ~~may~~ can be different in each country and ~~may~~ can include national or international regulatory bodies, national safety authorities, infrastructure ~~controllers~~ managers, and, in Europe, Notified Bodies (see Annex B).

3.3
contract
all the component parts of the technical specifications agreed between manufacturer and purchaser, consisting of purchaser's technical specifications, manufacturer's technical responses, minutes of meetings, and any other formal contract documents

3.4
d.c.
direct current

---

2 To be published.

3.5
EMC
electromagnetic compatibility

3.6
infrastructure ~~controller~~ manager
organisation which ~~controls~~ manages the railway infrastructure, including, for example, track, signalling, communications and structures

3.7
IP
ingress Protection

3.8
manufacturer
organisation which has the technical responsibility for the supply of the vehicle system.

Note 1 to entry: There ~~may~~ can be more than one manufacturer where the contract for the vehicle is split in two or more parts.

3.9
manufacturer's works
location where the assembly of the vehicles is completed and where static tests are generally performed

3.10
modification level
definition of equipment modification status for which the test results are valid

3.11
purchaser
organisation which orders and will own the vehicle

Note 1 to entry: The purchaser ~~may~~ can have the responsibility for direct negotiations with the manufacturer, unless that responsibility is delegated to the user, a main contractor or a consultant.

3.12
quality plan
document specifying which procedures and associated resources ~~shall be~~ are applied by whom and when to a specific project, product, process or contract (ISO 9000)

3.13
routine test
test to which each vehicle is subjected to during or after manufacture to ascertain whether it complies with the specified criteria

3.14
safety-related
carries responsibility for safety

3.15
supplier
organisation which has the responsibility for the supply of individual items of equipment or groups of equipment to the manufacturer

3.16
supplier's works
location where individual items of equipment or groups of equipment are manufactured

3.17
test plan
plan of the tests to be undertaken by the manufacturer as presented within its quality plan, including all supporting information on the conduct of the tests

Note 1 to entry: In the context of this standard, the test plan includes all subordinate test specifications.

3.18
type test
test of one or more devices, system or complete vehicle to show that the design meets the required specifications and the relevant standards

3.19
UIC
Union Internationale des Chemins de Fer (International Union of Railways)

3.20
user
organisation which will use the vehicle

Note 1 to entry: The user will be a train operator and ~~may~~ can be the purchaser, or another party who uses the vehicle on behalf of the purchaser through, for example, a leasing arrangement.

3.21
validation documentation
documented evidence that a product, process or service is in conformance with specified requirements or other normative documents

3.22
voluntary test
any additional test (either type or routine) added to the Test Plan by agreement between the manufacturer and the purchaser

3.23
WSP
wheelslide protection

4 Requirements

4.1 General

The manufacturer shall exercise control over all activities affecting the quality of the products to ensure that the requirements of the standards or other normative documents to which the declaration refers are met.

For this purpose the manufacturer shall have at his disposal all necessary means for carrying out this control at all levels (for example raw materials, supplies, production, finished products or packing). Information on the manufacturer's quality system and the results of tests as appropriate shall be available.

The manufacturer shall establish and maintain a quality system. This shall include auditable procedures covering the final inspection and test operations, including workmanship standards, test specifications, test records, calibration of test instruments and equipment, document control, control of non-conforming products and personnel training.

~~NOTE~~ It is recommended that manufacturers operate a quality system in accordance with ISO 9001.