# IEC 61133

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# INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# 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.
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**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*

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~~[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*~~

2 To be published.

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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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

## Applications ferroviaires – Matériel roulant – Essais de matériel roulant après achèvement et avant mise en service

IEC 61133:2016-02(en-fr)

# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# SOMMAIRE

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# APPLICATIONS FERROVIAIRES – MATÉRIEL ROULANT – ESSAIS DE MATÉRIEL ROULANT APRÈS ACHÈVEMENT ET AVANT MISE EN SERVICE

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9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 61133 a été établie par le comité d'études 9 de l'IEC: Matériels et systèmes électriques ferroviaires.

Cette norme est dérivée de l'EN 50215.

Cette troisième édition annule et remplace la deuxième édition parue en 2006. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- Les références à des normes autres que des normes internationales ont été supprimées du texte principal; les notes ne font donc référence qu'à l'Annexe B;

- L'Annexe B a été mise à jour avec les informations européennes les plus récentes; les références croisées des STI et des EN avec les articles de l'IEC 61133 ont été ajoutées.

Le texte de cette norme est issu de la deuxième édition et des documents suivants:

| FDIS | Rapport de vote |
|---|---|
| 9/2096/FDIS | 9/2132/RVD |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

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- amendée.

# APPLICATIONS FERROVIAIRES – MATÉRIEL ROULANT – ESSAIS DE MATÉRIEL ROULANT APRÈS ACHÈVEMENT ET AVANT MISE EN SERVICE

## 1 Domaine d'application

La présente Norme internationale spécifie des critères généraux permettant de démontrer par des essais que les véhicules ferroviaires nouvellement construits et achevés satisfont aux normes ou autres documents normatifs.

La présente Norme internationale s'applique en tout ou en partie à tous les véhicules ferroviaires, à l'exception des véhicules spéciaux tels les véhicules de pose de voies, les nettoyeurs de ballast et les véhicules de transport de personnel. L'étendue de l'application de la norme à ces véhicules spéciaux sera précisément mentionnée au contrat afin de prendre en compte, si nécessaire, les exigences législatives.

NOTE 1 Les parties applicables de la norme dépendront du type de véhicule (par exemple: voyageurs, wagon, remorque motorisée, etc.).

NOTE 2 Le domaine d'application de la présente norme exclut les machines de construction, ainsi que les véhicules routiers/ferroviaires pour la construction et la maintenance des infrastructures ferroviaires.

NOTE 3 La présente norme ne traite pas des essais effectués sur des composants ou des équipements avant leur installation sur le véhicule.

Dans la mesure où la présente Norme internationale est applicable, elle peut être utilisée pour les matériels ci-après:

- équipements générateurs montés sur un véhicule prévu pour des fonctions auxiliaires;
- transmissions électriques utilisées sur les trolleybus ou véhicules similaires;
- équipements électriques de commande et auxiliaires des véhicules à propulsion autre qu'électrique;
- véhicules guidés, supportés ou mus électriquement par des systèmes qui n'utilisent pas l'adhérence roue sur rail.

NOTE 4 Des exigences techniques spécifiques s'appliquent aux véhicules exploités dans le domaine ferroviaire dans l'Union européenne. La source de ces exigences est donnée à l'Annexe B. Quand une exigence européenne s'applique à un article donné, une note est insérée à la fin de l'article.

## 2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60077 (toutes les parties), *Applications ferroviaires – Equipements électriques du matériel roulant*

IEC 60310:2015, *Applications ferroviaires – Transformateurs de traction et bobines d'inductance à bord du matériel roulant*

IEC 60322:2001, *Applications ferroviaires – Equipements électriques du matériel roulant – Règles relatives aux résistances de puissance de construction ouverte*

IEC 60349 (toutes les parties), *Traction électrique – Machines électriques tournantes des véhicules ferroviaires et routiers*

IEC 60494-1:2013, *Applications ferroviaires – Matériel roulant – Pantographes – Caractéristiques et essais – Partie 1: Pantographes pour véhicules grandes lignes*

IEC 60494-2:2013, *Applications ferroviaires – Matériel roulant – Pantographes – Caractéristiques et essais – Partie 2: Pantographes pour métros et tramways*

IEC 60529:1989, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 60571:2012, *Applications ferroviaires – Equipements électroniques utilisés sur le matériel roulant*

IEC 60850:2014, *Applications ferroviaires – Tensions d'alimentation des réseaux de traction*

IEC 61287 (toutes les parties), *Applications ferroviaires – Convertisseurs de puissance embarqués sur le matériel roulant*

IEC 61377-1, *Applications ferroviaires – Matériel roulant – Partie 1: Essais combinés de moteurs à courant alternatif alimentés par onduleur et de leur régulation*

IEC 61377-2, *Applications ferroviaires – Matériel roulant – Essais combinés – Partie 2: Moteurs de traction à courant continu alimentés par hacheur et leur régulation*

IEC 61377-3, *Applications ferroviaires – Matériel roulant – Partie 3: Essais combinés des moteurs à courant alternatif, alimentés par un convertisseur à deux étages, et leur régulation*

IEC 61991:2000, *Applications ferroviaires – Matériel roulant – Dispositions de protection contre les dangers électriques*

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IEC 62313:2009, *Applications ferroviaires – Alimentation électrique et matériel roulant – Critères techniques pour la coordination entre le système d'alimentation (sous-station) et le matériel roulant*

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NOTE Pour les applications dans l'Union européenne, se reporter également aux références données à l'Annexe B.

[1] À publier.