
Železniške naprave - Požarna zaščita na železniških vozilih - 5. del: Zahteve požarne varnosti za električno opremo, vključno z opremo trolejbusov, tirno vodenih avtobusov in lebdečih vozil (na magnetni ali drugi blazini)

(istoveten CLC/TS 45545-5:2004)

Railway applications - Fire protection on railway vehicles - Part 5: Fire safety requirements for electrical equipment including that of trolley buses, track guided buses and magnetic levitation vehicles

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English version

**Railway applications –
Fire protection on railway vehicles
Part 5: Fire safety requirements for electrical equipment
including that of trolley buses, track guided buses
and magnetic levitation vehicles**

Applications ferroviaires –
Protection contre les incendies dans les
véhicules ferroviaires

Partie 5: Exigences de sécurité incendie
pour l'équipement électrique, y compris
celui des trolleybus, des autobus guidés
et des véhicules à sustentation
magnétique

Bahnanwendungen –

Brandschutz in Schienenfahrzeugen
Teil 5: Brandschutzanforderungen
an die elektrische Ausrüstung
einschließlich der von Oberleitungs-
bussen, spurgeführten Bussen und
Magnetschwebfahrzeugen

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This Technical Specification was approved by CENELEC on 2004-03-16.

CENELEC members are required to announce the existence of this TS in the same way as for an EN and to make the TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force.

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This Technical Specification has been prepared by the Joint Working Group "Fire Safety in Railways" of CEN/TC 256, "Railway Applications" in cooperation with CENELEC/TC 9X "Electrical and electronic application for railways".

The text of the draft was submitted to the formal vote and was approved by CENELEC as CLC/TS 45545-5 on 2004-03-16.

The following date was fixed:

- latest date by which the existence of the TS
has to be announced at national level (doa) 2004-10-01

This Technical Specification is part of a series of European Standards "Railway applications – Fire protection on railway vehicles" which consists of:

- Part 1: General
- Part 2: Requirements for fire behaviour of materials and components
- Part 3: Fire resistance requirements for fire barriers and partitions
- Part 4: Fire safety requirements for railway rolling stock design
- Part 5: Fire safety requirements for electrical equipment including that of trolley buses, track guided buses and magnetic levitation vehicles
- Part 6: Fire control and management systems
- Part 7: Fire safety requirements for flammable liquid and flammable gas installations

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Introduction

This Technical Specification is based on existing fire safety regulations for railway vehicles from the International Union of Railways (UIC) and different European countries.

In using the operation and design categories defined in EN 45545-1, the requirements laid down in the different parts of the EN 45545 will take into account the current operating conditions for European public rail transport.

1 Scope

This Technical Specification specifies the fire safety requirements for electrical equipment on railway vehicles, including that of trolley buses, track guided buses and magnetic levitation vehicles.

The measures and requirements, specified in this Technical Specification meet the objective of protecting passengers and staff in railway vehicles in the event of a fire on board by:

- minimising the risk of starting a fire both during operation and as a result of technical defect and/or malfunction of the electrical equipment;
- ensuring that electrical emergency equipment continues to be available until evacuation is complete.

It is not within the scope of this Technical Specification to describe measures which ensure the preservation of the electrical equipment in the event of a fire on board.

2 Normative references

[SIST-TS CLC/TS 45545-5:2007](https://standards.iteh.ai/catalog/standards/sist/f5659d92-cf61-4882-8cbf-9d4f4d82f194/iec-ts-45545-5-2007)

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The following referenced documents are indispensable for the application 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.

EN 45545-1 ¹⁾, *Railway applications — Fire protection on railway vehicles — Part 1: General*

EN 45545-2 ²⁾, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behaviour of materials and components*

EN 45545-3 ¹⁾, *Railway applications — Fire protection on railway vehicles — Part 3: Fire resistance requirements for fire barriers and partitions*

EN 45545-4 ²⁾, *Railway applications — Fire protection on railway vehicles — Part 4: Fire safety requirements for railway rolling stock design*

EN 45545-6 ²⁾, *Railway applications — Fire protection on railway vehicles — Part 6: Fire control and management systems*

EN 50124-1, *Railway applications — Insulation coordination — Part 1: Basic requirements; Clearances and creepage distances for all electrical and electronic equipment*

1) At draft stage.

2) In preparation.

EN 50125-1, *Railway applications — Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

EN 50153, *Railway applications — Rolling stock — Protective provisions relating to electrical hazards*

EN 60352-1, *Solderless connections — Part 1: Wrapped connections — General requirements, test methods and practical guidance (IEC 60352-1)*

EN 60695-1-1, *Fire hazard testing — Part 1-1: Guidance for assessing the fire hazard of electrotechnical products — General guidelines*

EN 60695-4, *Fire hazard testing — Part 4: Terminology concerning fire tests (IEC 60695-4)*

EN 61140, *Protection against electric shock — Common aspects for installation and equipment (IEC 61140)*

EN 61210, *Connecting devices — Flat quick-connect terminations for electrical copper conductors — Safety requirements (IEC 61210, modified)*

EN ISO 13943, *Fire safety — Vocabulary (ISO 13943)*

IEC 60050-811, *International Electrotechnical vocabulary — Chapter 811: Electric traction*

ISO 3261, *Fire tests — Vocabulary (Bilingual edition)*

ISO 8421-1, *Fire protection; Vocabulary; Part 1: General terms and phenomena of fire (Bilingual edition)*

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3 Definitions

[SIST-TS CLC/TS 45545-5:2007](https://standards.iteh.ai/catalog/standards/sist-ts-clc-ts-45545-5-2007)

For the purpose of this document, the following definitions apply:

<https://standards.iteh.ai/catalog/standards/sist-ts-clc-ts-45545-5-2007>

3.1

arc barrier

a device to contain an electrical arc within a prescribed region

3.1.1

arc barrier Type A

device to contain an electrical arc of short duration, resulting from the normal operation of high power equipment, within a prescribed region

3.1.2

arc barrier Type B

device to contain an electrical arc of potentially long duration, resulting from a failure of high power equipment, within a prescribed region

3.2

arc splash barrier

device to offer protection against incandescent metal particles arising from making and/or breaking high power electrical contacts

3.3

enclosure

housing for separating the internal and external environment from the electrical equipment

3.4

electrical equipment

anything used, intended to be used or installed for use, to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy

3.5 High power circuits

All circuits listed below are high power circuits.

3.5.1

supply line

line between the current collector or current source and the main circuit breaker or main fuse(s) on the vehicle.

3.5.2

traction circuit

all circuits from main circuit breaker or main fuse(s) carrying the current of the machines and equipment, such as the convertors and traction motors, which transmit the traction output.

3.5.3 Auxiliary supplies

3.5.3.1

auxiliary circuit

circuit carrying the current of the auxiliaries such as the compressors and fans

[IEV 811-25-05]

3.5.3.2

train power supply

circuit supplying substantial amounts of power to each vehicle of a train for air-conditioning, heating and other auxiliary services

[IEV 811-25-06]

3.5.3.3

battery supply circuit

circuit carrying the current between the battery and the main battery protective device(s), or the unprotected part of the starting circuit

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3.6 Low power circuits

All circuits except those listed in the definition of high power are low power. For example:

3.6.1

low voltage circuit

circuit carrying current at a voltage significantly less than voltage of the contact line and supplied by a battery, a converter or a transformer

[IEV 811-25-02]

3.6.2

battery circuit

circuit carrying the current after the battery protective device(s)

3.6.3

starting circuit

specific circuit for starting up an internal combustion engine by its generator as motor or by a separate starter motor, except the unprotected part ³⁾

[IEV 811-25-10 - modified]

3.6.4

control circuit

circuit used to actuate the power or auxiliary equipment

[IEV 811-25-12]

³⁾ For this part of the standard, the unprotected part of a starting circuit is considered as high power.

3.6.5

interlock circuits

circuit linking mechanical, electrical or other devices, for example through auxiliary contacts, intended to make the operation of a piece of apparatus dependent on the condition or position of one or more others
[IEV 811-25-13]

3.6.6

indicating circuits and monitoring circuits

circuit transmitting a signal indicating or recording, whether a particular operating condition exists or not; for example a signal indicating a failure in the electrical equipment
[IEV 811-25-14]

3.6.7

protective circuit [IEV 811-25-15]

specific circuit, or a part of a control circuit, used for protection
[IEV 811-25-15]

3.6.8

audio-communication

circuit for sound communication, particularly by microphones and loudspeakers
[IEV 811-25-16]

4 Terminology

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For fire terms and definitions see the EN ISO 13943, ISO 8421-1, EN 60695-1-1 and EN 60695-4.

5 General requirements

[SIST-TS CLC/TS 45545-5:2007](https://standards.iteh.ai/catalog/standards/sist/f5659d92-cf61-4882-8cbf-9d6ca464c82/sist-ts-clc-ts-45545-5-2007)

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The normal electrical design requirements used for railway vehicles are supplemented by the design requirements of this specification.

In addition to the design requirements of this specification, electrical equipment shall be designed to withstand the mechanical, electrical and thermal stresses which are likely to be encountered in operation (see EN 50125-1).

The requirements for fire behaviour properties of materials are specified in EN 45545-2.

6 Design requirements

6.1 Overload protection

6.1.1 When selecting the method and setting of overload protection to be installed between the current collectors and consumers of a vehicle, consideration shall be given to the following:

- values of the short circuit currents;
- duration of these short circuit currents;
- any load side components which may modify the fault characteristics, i.e. the main filter reactor in a traction converter;
- characteristics of the power supply and its protection devices;
- where neither pole of the power supply is bonded to earth, the overload protection shall be on both poles of the supply line (e.g. trolley buses).