
Železniške naprave - Požarna zaščita na železniških vozilih - 4. del: Zahteve požarne varnosti za konstrukcijo železniških vozil

Railway applications - Fire protection on railway vehicles - Part 4: Fire safety requirements for rolling stock design

Bahnanwendungen - Brandschutz in Schienenfahrzeugen - Teil 4:
Brandschutzanforderungen an die konstruktive Gestaltung von Schienenfahrzeugen

Applications ferroviaires - Protection contre les incendies dans les véhicules ferroviaires
- Partie 4: Exigences de sécurité incendie pour la conception des véhicules ferroviaires

Ta slovenski standard je istoveten z: prEN 45545-4

<https://standards.itec.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022>

ICS:

13.220.20	Požarna zaščita	Fire protection
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

oSIST prEN 45545-4:2022**en,fr,de**

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

[oSIST prEN 45545-4:2022](https://standards.iteh.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022)

<https://standards.iteh.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 45545-4

February 2022

ICS 13.220.20; 45.060.01

Will supersede EN 45545-4:2013

English Version

Railway applications - Fire protection on railway vehicles - Part 4: Fire safety requirements for rolling stock design

Applications ferroviaires - Protection contre les incendies dans les véhicules ferroviaires - Partie 4: Exigences de sécurité incendie pour la conception des véhicules ferroviaires

Bahnanwendungen - Brandschutz in Schienenfahrzeugen - Teil 4: Brandschutzanforderungen an die konstruktive Gestaltung von Schienenfahrzeugen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents

European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	6
4 Fire protection measures.....	6
4.1 General.....	6
4.2 Minimizing the risk of a fire starting.....	6
4.2.1 General preventive measures	6
4.2.2 Catering and cooking areas.....	7
4.2.3 Luggage storage inside passenger areas.....	7
4.2.4 Visibility in passenger areas.....	7
4.2.5 Litter bins, ash trays and refuse containers.....	8
4.3 Evacuation and escape.....	8
4.3.1 Passenger emergency exits.....	8
4.3.2 Evacuation measures.....	9
4.3.3 Escape measures.....	10
4.3.4 Functions of systems for running capability.....	11
4.3.5 Emergency signs.....	12
4.3.6 Emergency lighting.....	12
5 Evaluation of conformity.....	12
Annex A (informative) Design guidance.....	13
A.1 General preventive measures.....	13
A.2 General design features.....	13
A.3 Seats.....	13
A.4 Air conditioning and ventilation systems.....	14
A.5 Heaters.....	14
A.6 Protection against sparks.....	14
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive (EU) 2016/797 aimed to be covered	15

iTech STANDARD
 PREVIEW
 (standards.itech.ai)

oSIST prEN 45545-4:2022
<https://standards.itech.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022>

European foreword

This document (prEN 45545-4:2022) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 45545-4:2013.

The main changes from EN 45545-4:2013 are:

- New requirements on 4.2.3;
- Suppression of 4.2.6;
- New requirements on 4.3.2.1;
- New requirements on 4.3.3.1;
- Addition of 4.3.5 and 4.3.6.

This series of European Standards *Railway applications — Fire protection on railway vehicles* consists of:

- Part 1: General;
- Part 2: Requirements for fire behaviour of materials and components;
- Part 3: Fire resistance requirements for fire barriers;
- 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.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

prEN 45545-4:2022 (E)

Introduction

EN 45545-4 has been developed from 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 45545-1:2013, the requirements laid down in this part take into account the current operating conditions for European public rail transport.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 45545-4:2022](https://standards.iteh.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022)

<https://standards.iteh.ai/catalog/standards/sist/9def4407-31d7-4483-abcc-9abe4fc688a0/osist-pren-45545-4-2022>

1 Scope

This document specifies fire safety requirements for railway vehicle design to cover the objectives defined in EN 45545-1:2013.

The measures and requirements specified in this document aim to protect passengers and staff in railway vehicles in the event of a fire on board by minimizing the risk of a fire starting, delaying the fire development and controlling the spread of fire products through the railway vehicle, thus aiding evacuation.

It is not within the scope of this document to describe measures which ensure the preservation of the railway vehicles in the event of a fire.

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.

EN 13272-1:2019, *Railway applications - Electrical lighting for rolling stock in public transport systems - Part 1: Heavy rail*

EN 13272-2:2019, *Railway applications - Electrical lighting for rolling stock in public transport systems - Part 2: Urban rail*

EN 14752:2019, *Railway applications - Bodyside entrance systems for rolling stock*

EN 15663:2017+A1:2018, *Railway applications - Vehicle reference masses*

EN 45545-1:2013, *Railway applications - Fire protection on railway vehicles - Part 1: General*

EN 45545-2:2020, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components*

EN 45545-3:2013, *Railway applications - Fire protection on railway vehicles - Part 3: Fire resistance requirements for fire barriers*

EN 45545-4:2013, *Railway applications - Fire protection on railway vehicles - Part 4: Fire safety requirements for rolling stock design*

EN 45545-5:2013+A1:2015, *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*

EN 45545-6:2013, *Railway applications - Fire protection on railway vehicles - Part 6: Fire control and management systems*

EN 45545-7:2013, *Railway applications - Fire protection on railway vehicles - Part 7: Fire safety requirements for flammable liquid and flammable gas installations*

EN 50553:2012, *Railway applications - Requirements for running capability in case of fire on board of rolling stock¹⁾*.

¹⁾ This document is impacted by AC:2013, A1:2016 and A2:2020.

prEN 45545-4:2022 (E)

EN ISO 13943:2017, *Fire safety - Vocabulary (ISO 13943:2017)*

ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 45545-1:2013 and EN ISO 13943:2017 apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Fire protection measures**4.1 General**

In consideration of the wide range of possible interior layouts for rail vehicles it is only possible to specify a limited number of normative requirements to control the risks of fires starting accidentally or deliberately and to then control the risks of such fires spreading. Informative guidance is therefore set out in Annex A to provide accepted good practice and design aspects to be considered.

NOTE Requirements for smoke containment are covered in part 6.

4.2 Minimizing the risk of a fire starting**4.2.1 General preventive measures**

Access shall be denied to all areas not intended for passenger use. These shall include, where applicable, but are not limited to:

- drivers' cabs;
- staff areas, for example staff offices, compartments, catering and cooking areas;
- luggage compartments;
- areas behind ceiling hatches or access panels;
- the interior of technical cabinets (including engine compartments);
- the interior of underfloor equipment cases.

Unauthorised areas shall be locked or otherwise secured. Locking devices shall take into account requirements for evacuation as set out in 4.3.

The surface temperature of equipment or equipment enclosures in passenger, staff and luggage areas shall not exceed 60 °C under normal conditions with the exception of catering or cooking equipment (see 4.2.2).

Typical examples of equipment acting as local sources of heat in passenger, staff and luggage areas are heating unit enclosures, lighting diffusers and/or lighting enclosures. This requirement should not be applied to equipment in technical areas, for example engine compartments.

The design of railway vehicles shall limit the risk of fires starting or developing by application of the measures in this document and the other parts of the EN 45545 series, and in addition by consideration of:

- the vehicle layout and shape of the vehicle and/or the layout and shape of elements of the vehicle;
- the potential for the build-up of combustible materials for example litter, oil or grease;
- requirements for cleaning;
- the potential for misuse and/or vandalism.

Guidance is set out in Annex A.

4.2.2 Catering and cooking areas

Cooking and catering appliances shall be installed so that the transfer of heat to adjacent surfaces and equipment is limited. The temperature of adjacent surfaces and equipment shall not exceed 60 °C.

Exposed surfaces of cooking and catering equipment except where required for the equipment's function shall not exceed 60 °C.

Gas installations shall comply with the requirements of EN 45545-7:2013.

Cooking and catering equipment should be designed so that railway vehicle movements do not produce a fire hazard due, for example to:

- spillage of flammable liquids onto hot surfaces; or
- by spillage leading to an accumulation of combustible waste over time.

4.2.3 Luggage storage inside passenger areas

Objects placed on overhead luggage racks shall be visible from below.

Luggage stacks shall not be used in Operation Category 4 vehicles.

Intermediate levels of luggage stacks should be completely closed.

Luggage stacks installed on the lower decks of a double deck vehicle and where evacuation of the upper deck requires descent to the lower deck shall be:

- enclosed by partitions or panelling, except where access is required for loading or unloading, that provides at least the fire resistance equivalent to a fire barrier with an E15 rating set out in EN 45545-3:2013 (see 5.6.4, Table 2);
- or
- protected by fixed fire fighting equipment installed in accordance with EN 45545-6:2013;
- or
- the upper deck is fully separated by a partition wall with a self-closing door which has no openings in the upper third when closed (except for door gaps).

4.2.4 Visibility in passenger areas

Visibility shall be maintained throughout passenger areas even if the passenger area is subdivided into smaller areas or compartments. The level of visibility shall be sufficient for standing passengers or staff to view adjacent passenger areas. This requirement does not apply to toilets or sleeping compartments.

prEN 45545-4:2022 (E)

If a passenger area or compartment is equipped with a fire detection system in accordance with EN 45545-6:2013, visibility from adjacent areas is not required.

4.2.5 Litter bins, ash trays and refuse containers

In areas where smoking is permitted, ashtrays shall be provided.

Ashtrays, litter bins, paper towel dispensers and receptacles for used paper towels shall be designed with the objective that an internal fire is prevented from spreading.

This can be achieved, for example, by the use of a metal container or a container constructed from materials that give a fire resistance performance of at least E10, as set out in EN 45545-3:2013 (see 5.6.4, Table 2) and with a self-closing lid or with a fire-extinguishing construction.

4.3 Evacuation and escape**4.3.1 Passenger emergency exits****4.3.1.1 General**

Railway vehicles intended to carry passengers shall be equipped with emergency exits for the purposes of evacuation and escape in accordance with the following requirements:

- a) there shall be at least one emergency exit on each vehicle side;
- b) vehicles designed to contain a normal payload of up to 40 passengers shall have at least two emergency exits. Vehicles designed to contain a normal payload of more than 40 passengers shall have at least four (two per side) emergency exits. The normal payload shall be determined in accordance with the category of train as defined in EN 15663:2017+A1:2018;
- c) compartments for short term use or which are normally unoccupied during operation, e.g. toilets or luggage compartments, do not require direct emergency exits to the exterior;
- d) in passenger or staff areas, normally occupied in service but which cannot be used as a through route (compartments), the distance for passengers or staff to the nearest external door or emergency exit shall be no more than 6 m;
- e) for restaurant cars, an emergency exit shall be located within 16 m from each place inside the restaurant car, measured along the longitudinal axis of the vehicle;
- f) all external passenger doors shall be considered as emergency exits. External passenger doors shall be equipped for this purpose in accordance with the requirements of EN 14752:2019;
- g) the location of emergency exits shall be indicated to passengers, staff and rescue services by appropriate signs.

Vehicles for use on a specific infrastructure may have external doors on only one side.

4.3.1.2 Staff emergency exits

For Operation Categories 2, 3 and 4 and for vehicles subject to EU Directive 2016/797/EU, staff emergency exits shall satisfy the following requirements:

- a) staff emergency exits shall provide a minimum clearance of 0,2 m² with a minimum inner dimension of 400 mm;
- b) from the driver's cab to the exterior of the railway vehicle, at least one of the following shall be provided on each side: