



SLOVENSKI STANDARD
SIST-TS CEN/TS 45545-3:2009

01-april-2009

Železniške naprave - Požarna zaščita na železniških vozilih - 3. del: Zahteve za požarno odpornost požarnih pregrad

Railway applications - Fire protection on railway vehicles - Part 3: Fire resistance requirements for fire barriers

Bahnanwendungen - Brandschutz in Schienenfahrzeugen - Teil 3: Feuerwiderstand von Feuerschutzabschlüssen

Applications ferroviaires - Protection contre les incendies dans les véhicules ferroviaires - Partie 3: Exigences de résistance au feu des barrières au feu

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Ta slovenski standard je istoveten z: CEN/TS 45545-3:2009

ICS:

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

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN/TS 45545-3

January 2009

ICS 45.060.01

English version

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

Applications ferroviaires - Protection contre les incendies
dans les véhicules ferroviaires - Partie 3: Exigences de
résistance au feu des barrières au feu

Bahnanwendungen - Brandschutz in Schienenfahrzeugen -
Teil 3: Feuerwiderstand von Feuerschutzabschlüssen

This Technical Specification (CEN/TS) was approved by CEN on 8 June 2008 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN/CENELEC will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN/TS 45545-3:2009) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

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

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

This series of Technical Specifications *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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This part 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 CEN/TS 45545-1, the requirements laid down in this part take into account the current operating conditions for European public rail transport.

1 Scope

This part specifies the fire resistance requirements and testing methods for fire barriers for railway vehicles.

The objective of the measures and requirements, specified in this part, is to protect passengers and staff in railway vehicles in the event of a developing fire on board.

It is not within the scope of this part to describe measures that ensure the preservation of the vehicles in the event of a fire.

2 Normative references

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 1363-1:1999, *Fire resistance tests — Part 1: General requirements*

EN 1363-2:1999, *Fire resistance tests — Part 2: Alternative and additional procedures*

EN 1364-1, *Fire resistance tests for non-loadbearing elements — Part 1: Walls*

EN 1365-2, *Fire resistance tests for loadbearing elements — Part 2: Floors and roofs*

EN 1634-1, *Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware - Part 1: Fire resistance tests for doors, shutters and openable windows*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

CEN/TS 45545-5, *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 ISO 1182, *Reaction to fire tests for building products — Non-combustibility test (ISO 1182:2002)*

EN ISO 1716, *Reaction to fire tests for building products — Determination of the heat of combustion (ISO 1716:2002)*

EN ISO 13943:2000, *Fire safety — Vocabulary (ISO 13943:2000)*

ISO 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 8421-1:1987, *Fire protection — Vocabulary — Part 1: General terms and phenomena of fire*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943:2000 and the following apply.

3.1

fire barrier

element that is intended for use in maintaining separation between two adjacent areas of a railway vehicle in the event of a fire which resists the passage of flame and/or heat and/or effluents for a period of time under specified conditions

3.2

fire resistance

ability of an item to fulfil for a stated period of time the required stability and/or integrity and/or thermal insulation, and/or other expected duty specified in a standard fire-resistance test

3.2.1

integrity criterion "E"

ability of the product/element of construction that has a separating function, to withstand fire exposure on one side only, without the transmission of fire to the unexposed side as a result of the passage of flames or hot gases. They can cause ignition either of the unexposed surface or of any material adjacent to that surface.

The integrity needs to be determined by 3 methods during the test:

- cracks or openings in excess of given dimensions;
- ignition of a cotton pad;
- sustained flaming on the unexposed side.

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The times of each mode of integrity failure are recorded

3.2.2

thermal insulation criterion "I"

ability of the product/element of construction to withstand fire exposure on one side only, without the transmission of fire as a result of significant transfer of heat from the exposed side to the unexposed side. Transmission shall be limited so that neither the unexposed surface nor any material in close proximity to that surface is ignited. The product / element shall also provide a barrier to heat, sufficient to protect people near to it

NOTE This term is the same as "heat insulation" of the TSI.

3.2.3

radiation criterion "W"

ability of the product/element of construction to withstand fire exposure on one side only, so as to reduce the probability of the transmission of fire as a result of significant radiated heat either through the product/element or from its unexposed surface to adjacent materials. The product/element can also need to protect people in the vicinity. A product/element that satisfies the insulation criterion I is also deemed to satisfy the W requirement for the same period.

Failure of integrity under the 'cracks or openings in excess of given dimensions' or the 'sustained flaming at unexposed side' criteria means automatically failure to the radiation criterion

3.3

high power

all circuits listed in this sub clause are high power circuits

NOTE See CEN/TS 45545-5.

CEN/TS 45545-3:2009 (E)**3.3.1****supply line**

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

3.3.2**traction circuit**

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

3.3.3**auxiliary supplies****3.3.3.1****auxiliary circuit**

<definition IEV 811-25-05>

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

3.3.3.2**train power supply**

<definition IEV 811-25-06>

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

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3.3.3.3**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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3.4**electrical equipment**

equipment 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**arc barrier**

device to contain an electrical arc within a prescribed region

NOTE See CEN/TS 45545-5.

3.6**passenger area**

area to which passengers have legitimate access

NOTE See CEN/TS 45545-4.

3.7**staff area**

area to which only members of staff have legitimate access

NOTE See CEN/TS 45545-4.

3.8**passenger or staff compartment**

passenger or staff area not intended as a through route for passengers or staff respectively

NOTE See CEN/TS 45545-4.

3.9**luggage container**

single volume of less than 4 m³ contained on 6 sides by elements with specified fire resistant performance (including joints and/or fixings to the surrounding structure)

3.10**luggage compartment**

single volume contained on a defined number of sides (which may include floor and ceiling) by elements with specified fire resistance performance (including joints and/or fixings to the surrounding structure), to which passenger have no access without authorisation

NOTE 1 Luggage placed in luggage containers should no longer be considered as luggage for the purposes of other requirements.

NOTE 2 See CEN/TS 45545-4.

3.11**technical cabinet**

cabinet containing mechanical and / or electrical equipment which is normally not occupied during operation and which can generate fire resulting from technical defects according to CEN/TS 45545-1:2009, 4.3

NOTE See CEN/TS 45545-6.

4 Terminology iTeh STANDARD PREVIEW

For the purposes of this document, (with the exception of the terms and definitions defined in Clause 3, the terminology given in EN ISO 13943:2000 and ISO 8421-1:1987 apply.

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5 Application of fire barriers

Railway vehicles shall be equipped with fire barriers at locations specified in Table 1.

6 Classification, requirements and test procedures**6.1 Classification of fire barriers**

Fire barriers shall have fire resistance properties verified by:

- a fire resistance test based on the principles of EN 1363-1, or
- assessment based on fire resistance testing.

Fire barriers shall have performance based on one of the three parameters as specified in Table 1:

- the lowest performing barrier is E = Integrity;
- the next level of performance would be requested E W = Integrity and Radiation transfer;
- the top level is E I = Integrity and Insulation requirement.

In respect to determining integrity (E) rules the cotton pad result shall not be used.

The use of the parameters shall be according to the principles described in EN 13501-2.

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Barrier performance shall be designated for example as E 30, I 15, which means: integrity is maintained for 30 min and insulation is maintained for 15 min.

6.2 Arc barrier Type A

The Type A arc barrier according to CEN/TS 45545-5 shall have an E15 requirement.

6.3 Arc barrier Type B

The Type B arc barrier according to CEN/TS 45545-5 shall have an E60 requirement.

6.4 Requirements

6.4.1 General

The requirements for fire barriers depend upon the operation and design categories and their location in the vehicle.

The fire barriers shall be located as specified in Table 1. Examples of the barriers in Table 1 are described in Figure 1 to Figure 4.

All vertical fire barriers in the cross section of a railway vehicle shall cover the entire area between floor and roof. In this context, the middle floor of a double decked vehicle shall be considered as a floor for the upper deck and as a roof for the lower deck. Where a vertical barrier reaches the side wall, it shall be extended to the body shell.

Closing devices for ventilation ducts shall conform to the following requirements:

- a) where a ventilation duct passes through a fire barrier, the duct shall have a closing device where it passes through the barrier unless the complete duct meets the same level of fire resistance requirements as the barrier either for its entire length, or for its length to the next fire barrier or closing device;
- b) closing devices shall meet the same fire resistance requirements as fire barriers;
- c) closing devices shall operate on reaction to a fire.

Penetrations e.g. for ducts, cables which pass through fire barriers shall be designed so as not to reduce the fire resistance of the barrier.

Table 1 — Fire barrier requirements

No	Fire origin	Protected location	Remarks	Operation category	Requirements
1	Underfloor technical cabinet containing electrical high power supply or traction circuits except brake resistor	Passenger and staff area including driver's cab	<p>Tested in accordance with EN 1364-2</p> <p>The requirement applies from the inside to the outside surface of the top of the box</p> <p>Where there is a requirement between the technical cabinet and the passenger or staff area there shall be a type A arc barrier</p> <p>CEN/TS 45545-5 require a type A arc barrier to be fitted if an electric arc is possible during normal operation</p>	1 to 4	E15
2	Underfloor traction transformers or reactors filled with insulation fluid	Passenger and staff area including driver's cab	<p>Tested in accordance with EN 1364-2</p> <p>Whole cross section and 1 m longer than the object on each longitude direction</p> <p>Requirements are defined from underfloor to the top of the floor covering</p>	1 and 2 3 and 4	E15 E15; I15
3	Underfloor combustion engine (including heating equipment, fuel tank and pipe work)	Passenger and staff area including driver's cab	<p>Tested in accordance with EN 1364-2</p> <p>Whole cross section and 1 m longer than the object on each longitude direction</p> <p>Requirements are defined from underfloor to the top of the floor covering</p>	1 and 2 3 and 4	E15 E15; I15
4	Underfloor	Passenger and staff area including driver's cab	<p>Tested in accordance with EN 1364-2</p> <p>Requirements are defined from underfloor to the top of the floor covering</p>	1 and 2 3 and 4	No requirement E15