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**Železniške naprave - Načrtovanje za osebe z omejenimi gibalnimi sposobnostmi - Splošne zahteve - 1. del: Kontrast**

Railway applications - Design for PRM Use - General requirements - Part 1: Contrast

Bahnanwendungen - Gestaltung für mobilitätseingeschränkte Menschen - Allgemeine Anforderungen - Teil 1: Kontrast

Applications ferroviaires - Conception destinée à l'usage par les PMR - Exigences générales - Partie 1: Contraste

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**ICS:**

11.180.01	Pripomočki za onesposobljene in hendikepirane osebe na splošno	Aids for disabled and handicapped persons in general
45.020	Železniška tehnika na splošno	Railway engineering in general

**SIST EN 16584-1:2017**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 16584-1**

January 2017

ICS 11.180.01; 45.020

English Version

**Railway applications - Design for PRM use - General  
requirements - Part 1: Contrast**

Applications ferroviaires - Conception destinée à  
l'usage par les PMR - Exigences générales - Partie 1:  
Contraste

Bahnanwendungen - Gestaltung für die Nutzung durch  
PRM - Allgemeine Anforderungen - Teil 1: Kontrast

This European Standard was approved by CEN on 10 September 2016.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**EN 16584-1:2017 (E)****European foreword**

This document (EN 16584-1:2017) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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 EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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

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## Introduction

This document is part of a suite of four ‘Design for PRM use’ standards that have in total nine parts:

- EN 16584 is a standard that covers both infrastructure and rolling stock — Railway applications — Design for PRM use — General requirements:
  - Part 1: Contrast (EN 16584-1)
  - Part 2: Information (EN 16584-2)
  - Part 3: Optical and friction characteristics (EN 16584-3)
- EN 16585 is a standard that covers rolling stock — Railway applications — Design for PRM use — Equipment and components on board rolling stock:
  - Part 1: Toilets (EN 16585-1)
  - Part 2: Elements for sitting, standing and moving (EN 16585-2)
  - Part 3: Clearways and internal doors (EN 16585-3)
- EN 16586 is a standard that covers rolling stock — Railway applications — Design for PRM use — Accessibility of persons with reduced mobility to rolling stock:
  - Part 1: Steps for access and egress (EN 16586-1)
  - Part 2: Boarding aids (EN 16586-2)
- EN 16587 is a standard that covers infrastructure — Railway applications — Design for PRM use — Requirements for obstacle free routes for infrastructure.

These standards aim to clarify the requirements (with clear and consistent terms and definitions) and to define the associated criteria and, where appropriate, methodologies to allow a clear pass/fail assessment.

## EN 16584-1:2017 (E)

## 1 Scope

This European Standard describes the specific 'Design for PRM use' requirements applying to both infrastructure and rolling stock and the assessment of those requirements. The following applies to this standard:

- The definitions and requirements describe specific aspects of 'Design for PRM use' required by persons with disabilities and persons with reduced mobility as defined in the PRM TSI.
- This standard defines elements that are universally valid for obstacle free travelling including lighting, contrast, tactile feedback, transmission of visual and acoustic information. The definitions and requirements of this standard cover the infrastructure and rolling stock applications.
- This standard only refers to aspects of accessibility for PRM passengers it does not define non PRM related requirements and definitions.
- This standard assumes that the infrastructure or rolling stock is in its defined operating condition.
- Where minimum or maximum dimensions are quoted these are absolute NOT nominal requirements.

The 'General requirements' standard is written in three parts:

- This document is Part 1 and contains
  - contrast;
- Part 2 contains
  - spoken information;
  - written information;
  - tactile information;
  - pictograms;
- Part 3 contains
  - lighting;
  - low reflective properties;
  - transparent obstacles;
  - slip resistance.



## 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.

EN 10088-2:2014, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 13272, *Railway applications - Electrical lighting for rolling stock in public transport systems*

EN 16584-2:2017, *Railway applications — Design for PRM use — General requirements — Part 2: Information*

EN 16584-3, *Railway applications — Design for PRM use — General requirements — Part 3: Optical and friction characteristics*

prEN 16586-1:2013, *Railway applications — Design for PRM use — Accessibility of persons with reduced mobility to rolling stock — Part 1: Steps for access and egress*

prEN 16587:2013, *Railway applications — Design for PRM use — Requirements for obstacle free routes for infrastructure*

ISO 17398, *Safety colours and safety signs — Classification, performance and durability of safety signs*

ISO 21542:2011, *Building construction — Accessibility and usability of the built environment*

## 3 Terms and definitions

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

### 3.1

#### **bezel**

raised area that surrounds a pressel as part of a pushbutton

### 3.2

#### **character height**

vertical size of uppercase letters or numbers

### 3.3

#### **contrast**

perception of a difference visually between one surface or element of a building/rail vehicle and another by reference to their light reflectance values (LRV) or luminance values

Note 1 to entry: See BS 8300:2009+A1:2010 for further information

### 3.4

#### **customer information**

visual and spoken information other than information intended only for staff

### 3.5

#### **first step**

step that is the first step for a passenger to use, to overcome a height change

**EN 16584-1:2017 (E)**

Note 1 to entry: For the external access/egress steps this will normally be the step that is closest to the platform edge (it may be a fixed or a moveable step), therefore this is the first step when boarding and the last step when alighting.

Note 2 to entry: In the context of steps for internal height changes (other than the external access/egress steps) this means the first usable step when ascending and the edge of the walking floor when descending

**3.6****fixed longitudinal seat**

passenger seat which is installed along the body side (not foldable or intended to tip up) facing perpendicular to the direction of travel

**3.7****free standing device**

element or item within the confines of the station and on platforms, whether fixed or removable, that is not part of the station structures

Note 1 to entry: Elements that are not included in this definition are lifts, external staircases, walls, any suspended devices, (the lower most part of which is more than 2 100 mm above the walking floor) and items that have a dimension greater (perpendicular to the walking direction) than 2 000 mm (e.g. fence, waiting shelter)

**3.8****halo**

illuminated ring surrounding a pressel, not necessarily continuous

**3.9****hue and chroma**

attributes of a colour which include its hue (frequency) and saturation (the dominant wavelength of a colour) also known as "chromaticity"

Note 1 to entry: A colour system (colour space, colour model) defines colour by hue, saturation and brightness. The hue is the predominant colour, the saturation is the colour intensity from achromatic (colourless) to the pure colour and the value (result) is the brightness from light to dark

**3.10****innovative solution**

technological progression that results in a solution that does not comply with the specification set out in Clause 5 of this standard or for which there are no assessment methods

Note 1 to entry: An innovative solution (Article 6 Commission Regulation (EU) No 1300/2014) may only be used following a positive opinion from the European Commission

**3.11****last step**

final step for an ascending passenger to use to overcome a height change, forming the edge of the walking floor

**3.12****Light Reflectance Value (LRV)**

total quantity of visible light that is reflected by a surface at all wavelengths and directions when illuminated by a light source

Note 1 to entry: The measured range of LRV is between 0 and 100 points.

Note 2 to entry: See Annex F for further information.

**3.13****low reflective properties**

characteristics that reduce reflection of light from a surface

**3.14****pictogram**

graphical symbol, diagram or figure with a particular meaning which directly represents or conveys its meaning independently of language through a pictorial representation of a physical object, action or character

Note 1 to entry: Refer to ISO 7001:2007, ISO/TR 7239 and ISO 9186 (all parts) for rules regarding graphical symbols and frames

**3.15****pressel**

surface of the pushbutton which is pressed in order to activate the pushbutton

**3.16****routeing information**

information, used by passengers to guide them on their journey, a guide as to which route to take to get to a required destination or facility and changes along that journey

Note 1 to entry: This can be temporary information to an event e.g. exhibition or sporting event but NOT any form of commercial advertising.

**3.17****spoken information**

information audibly communicated in words

Note 1 to entry: This can be direct, pre-recorded or synthesized information

**3.18****station**

any form of infrastructure where a train operates and passengers can board or alight in normal operation

**3.19****station building**

building or structure within the confines of the station in areas for use by passengers which can be open at different times to the overall station

Note 1 to entry: This does not include other commercial structures that are not essential for travel

**EN 16584-1:2017 (E)****3.20****tactile**

information that is understood through the physical sense of touch

Note 1 to entry: Tactile signs, controls, symbols, pictograms, guide path and Braille or raised characters are a physical means by which tactile information is provided

**3.21****transparent obstacle**

obstacle that allows objects or images to be seen as if there were no intervening material, seen through with a level of clarity

Note 1 to entry: Transparency in this standard is when an obstacle allows at least 50 % direct light transmission

**3.22****universal toilet**

toilet designed to be used by all passengers including passengers in wheelchairs

**3.23****visual acuity**

clearness or acuteness of vision

**3.24****visual information**

written information, pictograms and markings

**3.25****written information**

information visually communicated in words, letters and numerals, excluding pictograms and markings

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## 4 Symbols and abbreviations

**Table 1 — Abbreviations**

Abbreviation	Designation
CIE	Commission Internationale de l'Eclairage.
EN	European Standard
ISO	the International Organization for Standardization
LRV	Light Reflectance Value
NCS	Natural Colour System
PRM	Persons with disabilities and persons with reduced mobility
TSI	Technical Specification for Interoperability
UV	Ultraviolet light

**Table 2 — Symbols**

Symbol	Designation	Unit
$E_F$	brightness of extraneous light	
$k$	unit of contrast	
$K$	correlated colour temperature (of a light source)	Kelvin
$K_{eff}$	the effective contrast	
$L$	unit of luminance in candela per square metre	cd/m <sup>2</sup>
$L_0$	the LRV of the object	
$L_1$	the luminous densities for self-lit displays when off	
$L_2$	the luminous densities for self-lit displays when on	
$L_c$	the LRV of the character (signage only)	
$L_F$	the luminance generated by extraneous light	
$L_h$	the LRV of the background or adjacent surface	
lx	illuminance	lux
m	length	metre
mm	length	millimetre
nm	length (one billionth of a metre)	nanometre
$\rho_A$	reflectance value of surface of the display	

## 5 Requirements and assessment

### 5.1 General

Assessment of the requirements identified in Clause 5 shall be according to Annex D and Annex E. Where additional assessment criteria apply, these will be identified against the relevant clause.

**EN 16584-1:2017 (E)**

The fonts, symbols and pictograms used for visual information shall contrast with their background.

- Contrast shall be assessed according to Annex A.

All dimensions in the figures are in millimetres (mm) unless otherwise stated.

**5.2 Infrastructure****5.2.1 Obstacle-free routes****5.2.1.1 Horizontal circulation**

Where thresholds are installed on a horizontal route, they shall contrast with the surrounding floor and shall not be higher than 25 mm.

- Contrast shall be assessed according to Annex A.
- Assessment of height shall be according to prEN 16587:2013.

**5.2.1.2 Vertical circulation**

As a minimum the first and last steps of staircases shall be indicated by a contrasting band.

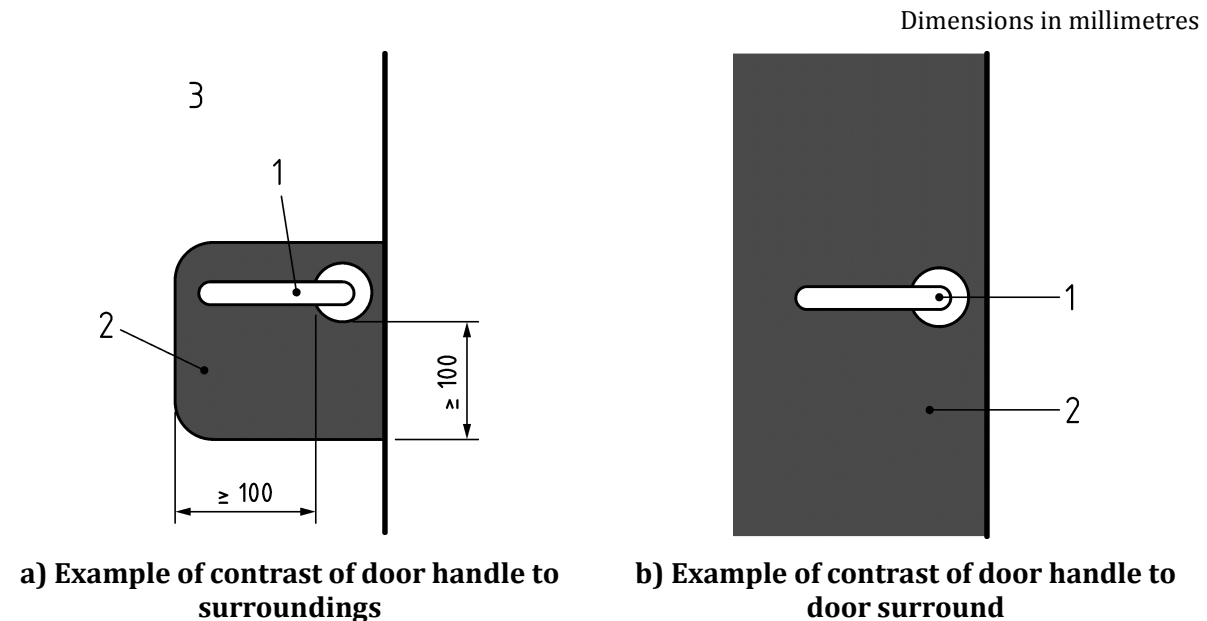
- Contrast shall be assessed according to Annex A.

**5.2.2 Doors and entrances**

This clause applies to all doors and entrances that are on obstacle-free routes according to prEN 16587:2013 with the exception of doors giving access to the toilets which are not dedicated to persons with disabilities and persons with reduced mobility.

If pushbuttons or other control devices are provided for operation of doors then each pushbutton or device shall contrast with its surroundings:

- contrast shall be assessed according to Annex A;
- the surroundings shall be defined as 100 mm in at least two directions (at least 90 degrees apart) from the edge of the control bezel outwards over at least the full width of that control (the resultant area shall be at least 20 000 mm<sup>2</sup>) see Figures 1a and 1b;
- the control for the doors if it is a pushbutton shall be assessed as the pressel, the illuminating halo and the bezel combined which shall have a minimum area of 5 000 mm<sup>2</sup>. See Figure 2.

**Key**

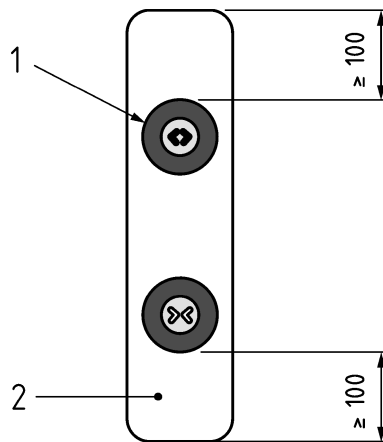
- 1 door control device (handle)
- 2 a) surroundings (may be the whole door or minimised as dimensioned)  
b) surroundings (door)
- 3 the rest of the door when localized contrast is used

**Figure 1 — Examples of contrast of door handles**

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Dimensions in millimetres

**Key**

- 1 door control device (for example pushbutton)
- 2 contrasting surface, min. 20 000 mm<sup>2</sup>, min. 100 mm in at least two directions from a cluster of pushbuttons

**Figure 2 — Example of contrast of pushbuttons to background**