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**Železniške naprave - Načrtovanje za osebe z omejenimi gibalnimi sposobnostmi - Splošne zahteve - 3. del: Značilnosti optike in trenja**

Railway Applications - Design for PRM Use - General Requirements - Part 3: Optical and Friction Characteristics

Eigenschaften Bahnanwendungen - Gestaltung für mobilitätseingeschränkte Menschen - Allgemeine Anforderungen - Teil 3: Rutschfestigkeit und Optische Eigenschaften

Applications ferroviaires - Conception destinée à l'usage par les PMR: Exigences générales - Partie 3: Caractéristiques optiques et de friction

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## Railway applications - Design for PRM use - General requirements - Part 3: Optical and friction characteristics

Applications ferroviaires - Conception destinée à l'usage par les PMR - Exigences générales - Partie 3 : Caractéristiques optiques et de friction

Bahnanwendungen - Gestaltung für die Nutzung durch PRM - Allgemeine Anforderungen - Teil 3: Optische Eigenschaften und Rutschfestigkeit

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**

<b>Contents</b>	<b>Page</b>
European foreword.....	3
<b>1 Scope</b> .....	<b>5</b>
<b>2 Normative references</b> .....	<b>6</b>
<b>3 Terms and definitions</b> .....	<b>6</b>
<b>4 Symbols and abbreviations</b> .....	<b>8</b>
<b>5 Requirements and assessment</b> .....	<b>8</b>
<b>5.1 General</b> .....	<b>8</b>
<b>5.2 Infrastructure</b> .....	<b>8</b>
<b>5.2.1 Obstacle free route</b> .....	<b>8</b>
<b>5.2.2 Floor surfaces</b> .....	<b>9</b>
<b>5.2.3 Transparent obstacles</b> .....	<b>9</b>
<b>5.2.4 Lighting</b> .....	<b>9</b>
<b>5.2.5 Visual information: signposting, pictograms, dynamic information</b> .....	<b>10</b>
<b>5.2.6 Platform danger area and edge of platform</b> .....	<b>10</b>
<b>5.2.7 Level track crossings</b> .....	<b>11</b>
<b>5.3 Rolling stock</b> .....	<b>11</b>
<b>5.3.1 Interior doors</b> .....	<b>11</b>
<b>5.3.2 Lighting</b> .....	<b>11</b>
<b>5.3.3 Access/egress steps</b> .....	<b>11</b>
<b>5.4 Boarding aids (ramps, lifts, movable steps and bridging plates) for infrastructure and rolling stock</b> .....	<b>11</b>
<b>6 Assessment methodologies</b> .....	<b>12</b>
<b>6.1 Slip resistance test</b> .....	<b>12</b>
<b>6.1.1 Principle</b> .....	<b>12</b>
<b>6.1.2 Preparation and procedure</b> .....	<b>12</b>
<b>6.1.3 Expression of results</b> .....	<b>13</b>
<b>6.1.4 Test Report</b> .....	<b>13</b>
<b>6.1.5 Friction test piece</b> .....	<b>13</b>
<b>Annex A (normative) EC verification</b> .....	<b>15</b>
<b>A.1 Interoperability constituents</b> .....	<b>15</b>
<b>A.1.1 Conformity assessment</b> .....	<b>15</b>
<b>A.1.2 Application of modules</b> .....	<b>15</b>
<b>A.2 Subsystems</b> .....	<b>16</b>
<b>A.2.1 EC verification (general)</b> .....	<b>16</b>
<b>A.2.2 Procedures for EC verification of a subsystem (modules)</b> .....	<b>16</b>
<b>Annex B (normative) Summary of testing requirements</b> .....	<b>18</b>
<b>Annex C (informative) Colour temperature for lighting</b> .....	<b>20</b>
<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered</b> .....	<b>21</b>
<b>Bibliography</b> .....	<b>22</b>

## European foreword

This document (EN 16584-3:2017) 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.

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

- The EN 16584 series is a standard that covers both infrastructure and rolling stock — Railway applications — Design for PRM use — General requirements:
  - Part 1: Contrast (EN 16584-1); <https://standards.iteh.ai/catalog/standards/sist/acdb2273-7e7e-4312-b9db-16584-3-2017>
  - Part 2: Information (EN 16584-2); <https://standards.iteh.ai/catalog/standards/sist/acdb2273-7e7e-4312-b9db-16584-3-2017>
  - Part 3: Optical and friction characteristics (EN 16584-3).
- The EN 16585 series 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).
- The EN 16586 series 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.

**EN 16584-3:2017 (E)**

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.

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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## 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:

- Part 1 contains:

- contrast.

- Part 2 contains: <https://standards.iteh.ai/catalog/standards/sist/acdb2273-7e7e-4312-b9db-3fbaa2a97d31/sist-en-16584-3-2017>

- spoken information;
- written information;
- tactile information;
- pictograms.

- This document is Part 3 and contains:

- lighting;
- low reflective properties;
- transparent obstacles;
- slip resistance.

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**EN 16584-3:2017 (E)****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 1838, *Lighting applications — Emergency lighting*

EN 12464 (series), *Light and lighting — Lighting of work places*

EN 13272:2012, *Railway applications — Electrical lighting for rolling stock in public transport systems*

EN 16584-1, *Railway applications — Design for PRM use — General Requirements — Part 1: Contrast*

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

prEN 16587:2013, *Railway applications — Design for PRM use — Requirements for Obstacle Free Routes for Infrastructure*

EN ISO 2813, *Paints and varnishes - Determination of gloss value at 20°, 60° and 85° (ISO 2813)*

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 21542, *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****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.

**3.2****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 points and 100 points.

**3.3****low reflective properties**

characteristics that reduce reflection of light from a surface



### 3.4

#### **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 for rules regarding graphical symbols and frames.

### 3.5

#### **slip resistant**

surface finish that is sufficiently rough or otherwise specially formulated so that friction between the surface and a person's footwear or mobility aid is maintained at an acceptable level in both wet and dry conditions

Note 1 to entry: Snow and ice are outside this definition and this standard, therefore other special measures (e.g. operational) should be taken for steps and platforms etc that are exposed to these weather conditions.

### 3.6

#### **spoken information**

information audibly communicated in words

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

### 3.7

#### **station**

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

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### 3.8

#### **station building**

any 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.

### 3.9

#### **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.

### 3.10

#### **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.

### 3.11

#### **visual acuity**

clearness or acuteness of vision

## EN 16584-3:2017 (E)

## 3.12

**visual information**

written information, pictograms and markings

## 3.13

**written information**

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

## 4 Symbols and abbreviations

**Table 1 — Abbreviations**

Abbreviation	Designation
CIE	International Commission on Illumination
EN	European Standard (Euronorm)
ISO	International Organization for Standardization
TSI	Technical Specification for Interoperability

**Table 2 — Symbols**

Symbol	Designation	Unit
Hz	unit of frequency	Hertz
K	unit of temperature	Kelvin
LRV	Light Reflectance Value	point
lx	unit of illuminance	lux
m	unit of length	metre
mm	unit of length	millimetre
s	unit of time	second

## 5 Requirements and assessment

### 5.1 General

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

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

### 5.2 Infrastructure

#### 5.2.1 Obstacle free route

Obstacle free route floor surfaces and ground surfaces shall have low reflective properties.

- The assessment shall be in accordance with EN ISO 2813 for paints and varnishes, an achieved gloss level of 50 or lower shall be assumed to be compliant. For any other ground material and/or surface materials an assessment is not necessary.

### 5.2.2 Floor surfaces

All floor coverings, ground surfaces and stair tread surfaces shall be slip resistant.

- The assessment shall be according to international or national standards.

### 5.2.3 Transparent obstacles

Transparent obstacles on or along the main routes used by passengers, consisting of glass doors or transparent walls, shall be marked. These markings shall highlight the transparent obstacles.

- Assessment of transparency shall be carried out with a Glass transparency meter, if transparency is greater than 50 % then the obstacle shall be marked.
- Assessment of the markings shall be according to EN 16584-1.

These markings are not required along transparent walls if passengers are protected from impact by other means — for example, by handrails or continuous benches.

Glass or other transparent/translucent materials that are coated or treated to reduce the light transmission shall have low reflective properties so as not to create a mirror effect (lighting is assumed to be the normal operating condition).

### 5.2.4 Lighting

- 1) The illuminance level of the external areas of the station shall be sufficient to facilitate way finding and to highlight the changes of level, doors and entrances.
  - Light levels shall be according to either ISO 21542 or the EN 12464 series and method of assessment according to the EN 12464 series.
- 2) The illuminance level along obstacle free routes shall be adapted to the visual task of the passenger. Particular attention shall be paid to the changes of levels, ticket vending offices and machines, information desks and information displays.
  - i. From the accessible building entrance to the platform access point, the obstacle free route shall be illuminated, measured at floor level, within the confines of the station building.
    - Light levels shall be according to either ISO 21542 or the EN 12464 series and method of assessment according to the EN 12464 series.
  - ii. The minimum lighting level shall be across the full width of the obstacle free route.
    - The obstacle free route shall be according to prEN 16587:2013.
    - The measurement shall be taken at floor level.
  - iii. The minimum required light level on stairs and at the start and end of ramps, shall be measured at floor level.
    - Light levels shall be according to either ISO 21542 or the EN 12464 series and method of assessment according to the EN 12464 series.
- 3) The platforms shall have a minimum average illumination level measured at floor level.