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Dostopnost in uporabnost grajenega okolja - Merila in specifikacije glede tehnične učinkovitosti

Accessibility and usability of the built environment - Technical performance criteria and specifications

Barrierefreiheit und Nutzbarkeit der gebauten Umgebung - Technische Leistungskriterien und Anforderungen

Accessibilité et utilisabilité de l'environnement bâti - Critères et spécifications de performance technique

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TECHNICAL REPORT

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English version

Accessibility and usability of the built environment - Technical performance criteria and specifications

Accessibilité et utilisabilité de l'environnement bâti - Critères et spécifications de performance technique

Barrierefreiheit und Nutzbarkeit der gebauten Umgebung - Technische Leistungskriterien und Anforderungen

This Technical Report was approved by CEN on 23 May 2021. It has been drawn up by the Technical Committee CEN/CLC/JTC 11.

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European foreword

This document (CEN/TR 17621:2021) has been prepared by the Joint Technical Committee CEN-CENELEC/JTC 11 “Accessibility in the built environment”, the secretariat of which is held by UNE.

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This document has been prepared under Mandate M/420 given to CEN, CENELEC and ETSI by the European Commission and the European Free Trade Association in support of European accessibility requirements for public procurement in the built environment.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN and CENELEC websites.

Introduction

This document exemplifies the technical performance criteria and specifications to fulfil the functional requirements given in the European Standard EN 17210. It demonstrates a proposal, or proposals, to achieve the EN requirements and recommendations, drawing on performance criteria and specifications given in International Standard ISO 21542, where these exist and/or with examples from other standards and guidance documents, where relevant.

Alternatively, national standards or regulations may be used to determine the technical performance criteria and specifications to fulfil the functional requirements of the EN 17210.

Another CEN-CENELEC Technical Report (CEN/TR 17622) will detail the assessment of conformity to the functional requirements given in the European Standard EN 17210.

This document is intended to be read alongside EN 17210. The structure in CEN/TR 17621 follows the EN structure, listing the equivalent headings, clauses and bullet points (a), b), c) etc.) and providing a way, or ways, to achieve the functional requirements and recommendations.

Where there are no technical criteria related to the EN clause / sub-clause, such as the Rationale, this is stated rather than leaving this blank.

Technical performance criteria and specifications from ISO 21542:2011 are used in the CEN/TR 17621 as the main source of information, and this is not referenced as the source each time, as this would be repetitive. When the source is ISO 21542:2021 (Enquiry version) we include this source in brackets, and other sources are also referenced.

Other sources are used where these have been identified as providing information not covered in ISO 21542 or useful supplementary information.

Additional sources include:

— 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.*

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

— EN 16587, *Railway applications – Design for PRM use –Requirements for obstacle free routes for infrastructure,*

— Other specific ENs and product related ENs,

— National standards,

— Guidance on a specific matter.

See also the Bibliography.

1 Scope

This document has been developed to support EN 17210, "Accessibility and usability of the built environment – Functional requirements". This document provides and exemplifies technical performance criteria and specifications for an accessible and usable built environment, following the Design for All/Universal design principles. The document specifies what is necessary to align with these principles which will facilitate equitable and safe use for a wide range of users.

The technical performance criteria and specifications are applicable across the full spectrum of the built environment and can be used as criteria for awarding public contracts (in support of the Public Procurement Directives).

These technical performance criteria and specifications are specifically applicable to the design, construction, refurbishment or adaptation, and maintenance of public or public-use environments including external areas.

Alternatively, national standards and regulations can determine the technical performance criteria and specifications to fulfil the functional requirements of EN 17210.

NOTE 1 Design for All and Universal Design share a similar inclusive design philosophy. Universal Design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. Universal Design does not exclude assistive devices for particular groups of persons with disabilities where this is needed (UN CRPD).

NOTE 2 Terms such as "design for all", "universal design", "accessible design", "barrier-free design", "inclusive design" and "transgenerational design" are often used interchangeably with the same meaning.

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 17210, *Accessibility and usability of the built environment - Functional requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17210 and the following apply:

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
light reflectance value
LRV
proportion of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source

Note 1 to entry: *LRV* is also known as the luminance reflectance factor or CIE Y value (see International Commission on Illumination, CIE, Publication 15:2004, 3rd Edition, *Colorimetry*).

Note 2 to entry: The *LRV* is expressed on a scale of 0 to 100, with a value of 0 points for pure black and a value of 100 points for pure white.

[SOURCE: ISO 21542:2011, definition 3.41]

3.2
luminance contrast
luminance of one surface or component compared to the luminance of the background or adjoining surface

[SOURCE: ISO 21542:2021, 3.28, modified]

4 Legal and policy background and associated benefits

See EN 17210, no applicable technical specification.

5 Diversity of users and design considerations

See EN 17210, no applicable technical specification.

6 Wayfinding

6.1 Wayfinding, orientation and navigation

6.1.1 Rationale

See EN 17210, no applicable technical specification.

The functional requirements and recommendations in EN 17210 can be achieved by providing:

6.1.2 General

This is an overview of 6.2 to 6.8.

6.2 Wayfinding information

6.2.1 Rationale

See EN 17210, no applicable technical specification.

The functional requirements and recommendations in EN 17210 can be achieved by providing:

6.2.2 General

a) Information that is regularly monitored for accuracy and checked with users of the environment for usefulness. See also Figure 1.

b) Priority of safety information, followed by information for wayfinding, then general and instructional information, though, for instance, relative size and positioning of visual information, and ordering of audible information with safety first etc. These are to stand out from advertising information.

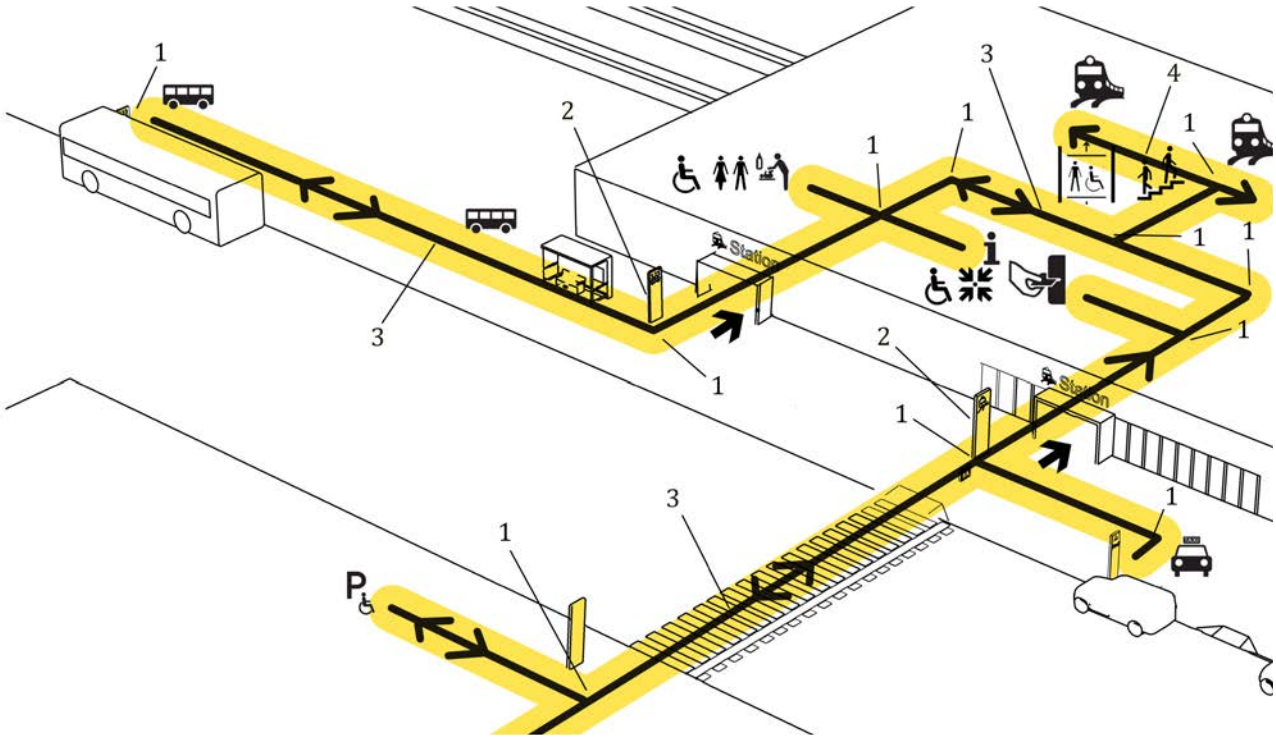
c) Only one key message for each announcement or sign, using short sentences or phrases.

d) Consistent information along a route including at decision points, for instance using the same term for ‘Meeting room 1’ along a route and at the destination, not changing to Training Room on arrival.

e) Short words avoiding abbreviations; with a clear meaning checked to ensure understood by users.

f) The same information through a range of formats such as audible, visual, tactile.

g) See 6.7 Graphical symbols.



Key

1 decision points with consistent information, minimum for every 50 m (EN 16587)
2 limited number of pictograms in signage on a single location (EN 16587)
3 tactile and visually contrasting routes (EN 16587)
4 audible information with requirements to speech intelligibility (EN 16587)

Figure 1 — Examples of wayfinding features on accessible routes in railway infrastructure

6.3 Visual contrast

6.3.1 Rationale

See EN 17210, no applicable technical specification.

The functional requirements and recommendations in EN 17210 can be achieved by providing:

6.3.2 General

Visual contrast according to the area and visual task in a) to c). Visual contrast is specified and measured in various ways in different European countries.

a) For large area surfaces (i.e. walls, floors, doors, ceiling) and to facilitate orientation and guiding (i.e. handrails, door furniture, and visual indicators on glazed areas) a visual contrast value of:

   — Using Michelson method, a luminance contrast C_M ≥ 30 % between the two surfaces, with *LRV* of the lighter surface ≥ 40 points; or

   — Using the Weber method, a luminance contrast C_W ≥ 45 % between the two surfaces, with *LRV* of the lighter surface ≥ 40 points; or

   — Using *LRV* difference method, a difference in *LRV* ≥ 30 points between the two surfaces; with *LRV* of the lighter surface ≥ 40 points.

b) For potential hazards, (i.e. visual indicator on steps and glazed doors), small items (i.e. switches and controls) and self-contrasting markings a high visual contrast value of:

— Using Michelson method, a luminance contrast $C_M \geq 60$ % between the two surfaces, with *LRV* of the lighter surface ≥ 50 points; or

— Using the Weber method, a luminance contrast $C_W \geq 75$ % between the two surfaces, with *LRV* of the lighter surface ≥ 50 points; or

— Using *LRV* difference method, a difference in *LRV* ≥ 60 points between the two surfaces or between the potential hazard and background surface.

c) To facilitate reading of signs, information and instructions, a high contrast value of:

— Using Michelson method, a luminance contrast $C_M \geq 60$ % between the text or symbols and the background, with *LRV* of the lighter surface ≥ 70 points; or

— Using the Weber method, a luminance contrast $C_W \geq 75$ % between the text or symbols and the background, with *LRV* of the lighter surface ≥ 70 points; or

— Using *LRV* difference method, a difference in *LRV* ≥ 60 points between the text or symbols and the background; with *LRV* of the lighter surface ≥ 70 points.

See Annex A for charts showing examples of the application of visual contrast using these methods.

Where reflecting materials with highly glossy or shiny surfaces are used for one or both surfaces of interest, e.g. brushed metal, a higher minimum luminance contrast value is required than for non-reflecting materials:

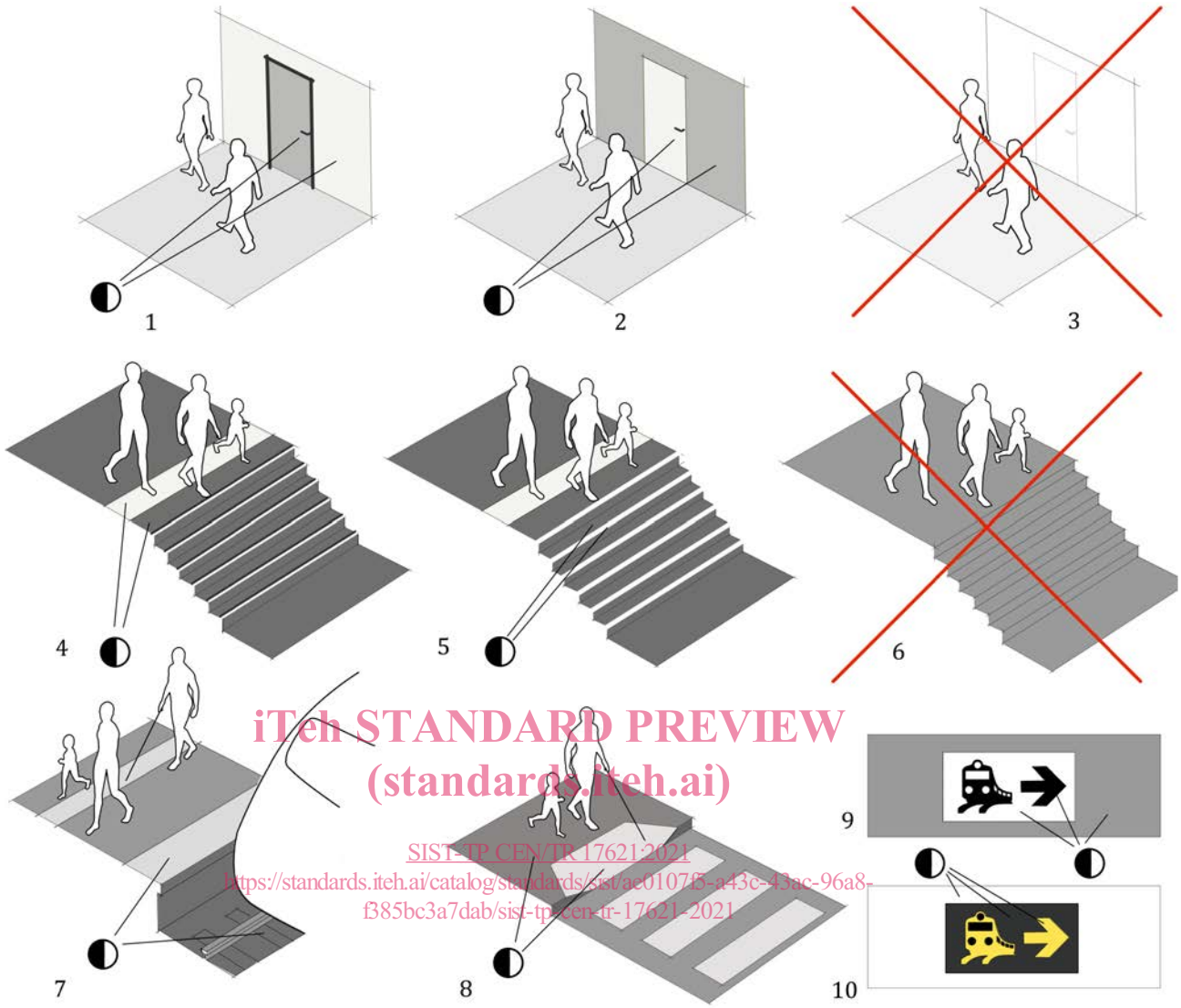
Large surface areas (i.e. walls, floors, doors, ceiling), elements and components to facilitate orientation (i.e. base plates of controls), $C_M \geq 40$ % with a minimum *LRV* of the lighter surface ≥ 40 points ($C_W \geq 57$ %, *LRV* difference ≥ 40 points).

Small items necessary to enable use of building elements (i.e. control buttons, inscriptions on controls), $C_M \geq 70$ % with a minimum *LRV* of the lighter surface ≥ 70 points, ($C_W \geq 82$ %, *LRV* difference ≥ 70 points).

See ISO 21542:2021, 10.3.3. For stainless steel, see also EN 16584-1.

For the application of visual contrast on elements see the specific clauses such as 6.6 Signage; 7.1 Accessible routes; 9.3 Doors and door frames; 10.2 Steps and stairs; 10.3 Handrails; 10.4 Lifts, 10.5 Vertical and inclined lifting platforms, 10.6 Escalators and moving walks and 12 Sanitary accommodations.

See also Figure 2 and Figure 3.



Key

1 light wall with contrast C_M ≥ 30 % (*LRV* difference ≥ 30 points) to darker door

2 grey wall with contrast C_M ≥ 30 % (*LRV* difference ≥ 30 points) to lighter door

3 not recommended: contrast C_M between wall and door less than 30 %

4 light tactile walking surface indicator with contrast C_M ≥ 50 % (*LRV* difference ≥ 50 points) to dark first step of stairs

5 dark step surface with contrast C_M ≥ 60 % (*LRV* difference ≥ 60 points) to light step nosing marking

6 not recommended: no step surface contrast to step nosings

7 light attention pattern on railway platform with contrast to dark area outside platform (EN 16584-1)

8 light kerb ramp with contrast C_M ≥ 50 % (*LRV* difference ≥ 50 points) to footpath

9 dark text or pictograms with contrast C_M ≥ 60 % (*LRV* difference ≥ 60 points) to white background, signage mounted on dark wall

10 light text or pictograms with contrast C_M ≥ 60 % (*LRV* difference ≥ 60 points) to dark background, signage mounted on light wall

Figure 2 — Examples of use of visual contrast in built environments

See Annex A with examples of visual contrast charts.

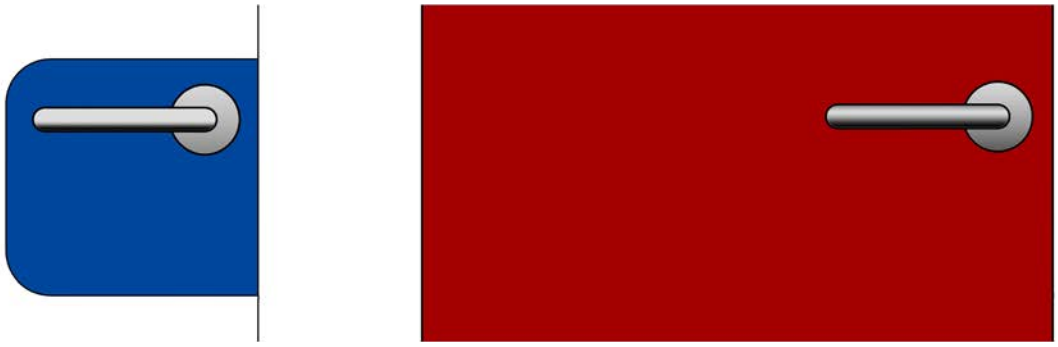


Figure 3 — Examples of visual contrast of door handles to surrounding areas (EN 16584-1)

6.3.3 Achieving and maintaining visual contrast

a) Where visual contrast is likely to deteriorate through, for example, cleaning of high trafficked floor surfaces; or weathering of outdoor surfaces for example asphalt can appear lighter over time and visual contrast reduced; or where lighting levels are low or subject to variation through changes in natural or artificial lighting levels; a higher contrast value at installation allows for this. For large areas, a luminance contrast $C_M \geq 40$ % (*LRV* difference ≥ 40 points) between the two surfaces, with *LRV* of the lighter surface ≥ 40 points; and for small items and potential hazards $C_M \geq 70$ % (*LRV* difference ≥ 70 points), with *LRV* of the lighter surface ≥ 70 points.

b) Regular checks of visual contrast levels in safety situations such as railway platforms and step nosings; to ensure high visual contrast is maintained for small items such as text, characters and symbols on signs, and for characters on small control buttons and operating mechanisms; and to ensure effective visual contrast is maintained where lighting levels are low.

c) A visual contrast equivalent to less than 20 points difference on the *LRV* scale throughout the different colours in a patterned floor surface.

6.3.4 Lighting and wayfinding

a) and b) See 15.1 Lighting.

6.3.5 Visual indicators on glazing

6.3.5.1 Rationale

See EN 17210, no applicable technical specification.

The functional requirements and recommendations in EN 17210 can be achieved by providing:

6.3.5.2 General

a) Uninterrupted visual indicators of at least 75 mm height placed at a height of 900 mm to 1 000 mm and 1 500 mm to 1 600 mm above floor level. An additional visual indicator placed at a height of 100 mm to 300 mm is recommended. See 9.3.11 Glazed doors and panels.

NOTE Partially sighted persons can have a limitation of visual field, which results in looking down at an angle of 45 ° to 50 °. When they are within 1 000 mm to 1 500 mm from a fully glazed door or sidelight, they can detect the visual barrier at a height of 900 mm to 1 000 mm, provided the visual contrast criteria have been applied to the background. The background in all cases is the circulation space on the opposite side of the glass door.

Visual indicators on general glazed areas with a difference in visual contrast $C_M \geq 30$ % (*LRV* difference ≥ 30 points) to the background, with *LRV* of the lighter surface ≥ 40 points. Visual indicators consisting of two separate colours, or two shades of the same colour, with a visual contrast $C_M \geq 60\%$ / $C_W \geq 75\%$, and *LRV* of the lighter surface ≥ 50 points (*LRV* difference ≥ 60 points) are preferred as they enable lighting conditions and backgrounds from either side of the glazing to be taken into account (ISO 21542: 2021, 8.1.1.4; EN 16584-1:2017, Annex B.6).

Visual indicators may also take the form of a broken line, sign, logo, or patterning on the glass with the visually contrasting indicator covering at least 75 % of the 100 mm indicator zone. For two-tone indicators each of the two colours or shades covers at least 30 % of the zone with a combined total of 75 % of the zone (EN 16584-1:2017, Annex B.6).

b) A visually contrasting strip on the edge of any free-standing glazed screens with a visual contrast $C_M \geq 60\%$ / $C_W \geq 75\%$, and *LRV* of the lighter surface ≥ 50 points to the background (*LRV* difference ≥ 60 points). See 9.3.11 Glazed doors and panels.

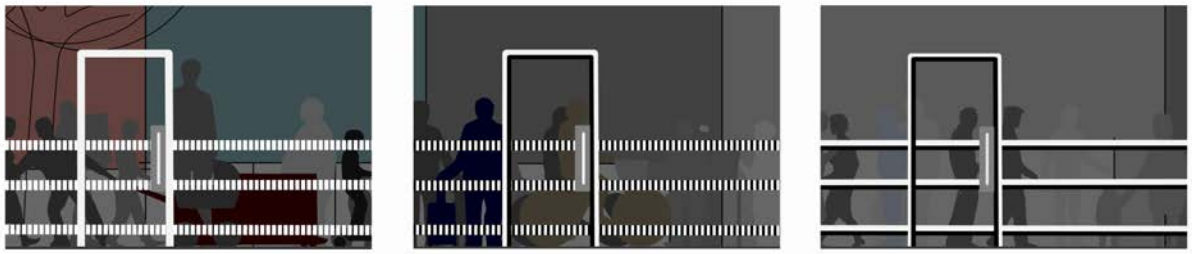
See Figure 4, Figure 5 and Figure 6.

a) light 75 % coverage bands on shifting background

b) self-contrasting full coverage bands on shifting background

c) self-contrasting full coverage bands on low contrast background

Figure 4 — Examples of visually contrasting markings on different backgrounds, daylight conditions



a) light 75 % coverage bands on dark background

b) self-contrasting full coverage bands on dark background

c) self-contrasting full coverage bands on dark background

Figure 5 — Examples of visually contrasting markings on different backgrounds, low light conditions