SLOVENSKI STANDARD
SIST EN 13272-2:2020

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Železniške naprave - Električna razsvetljava v železniških vozilih za javne prevozne sisteme - 2. del: Mestna železnica

Railway applications - Electrical lighting for rolling stock in public transport systems - Part 2: Urban rail

Bahnanwendungen - Elektrische Beleuchtung in Schienenfahrzeugen des öffentlichen Verkehrs - Teil 2: Städtische Schienenbahnen

Applications ferroviaires - Éclairage électrique pour matériel roulant des systèmes de transport public - Partie 2 : Rail urbain

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ICS:

45.140	Oprema za podzemne vlake, tramvaje in lahka tirna vozila	Metro, tram and light rail equipment
91.160.10	Notranja razsvetljava	Interior lighting

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EUROPEAN STANDARD

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English Version

Railway applications - Electrical lighting for rolling stock in public transport systems - Part 2: Urban rail

Applications ferroviaires - Éclairage électrique pour matériel roulant des systèmes de transport public - Partie 2 : Rail urbain

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

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European foreword

This document (EN 13272-2:2019) 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of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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

This document, together with EN 13272-1:2019, supersedes EN 13272:2012.

This series of documents *Railway applications — Electrical lighting for rolling stock in public transport systems* consists of the following parts:

— Part 1: *Heavy rail*;

— Part 2: *Urban rail* (this document).

With regard to the previous edition, the following changes have been made:

— This part of EN 13272 for electrical lighting in urban rail vehicles is new, whereas EN 13272-1 (for heavy rail) has been revised with regard to applicable TSIs and new lighting technologies.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: 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 the United Kingdom.

Introduction

This document sets out the requirements for interior lighting for urban rail vehicles, as defined in the CEN-CENELEC Guide 26.

1 Scope

This document contains performance requirements and recommendations for electrical lighting systems in the interiors of public transport urban rail vehicles, as defined in the CEN-CENELEC Guide 26, i.e. metro systems, trams, light rail, and local rail systems, under all operating and emergency conditions.

This document applies only to new units.

The application of this document for retro-fitting of existing units is subject to agreement between Contractors.

This document also defines the requirements for testing and conformity assessment.

This document does not address lighting installed in instruments or controls.

This document does not address lighting installed for indication or effect purposes, including flashing lights and decorative lighting.

NOTE 1 The requirements for interior lighting for heavy rail vehicles can be found in EN 13272-1.

NOTE 2 The requirements for cab instrument lighting for heavy rail vehicles can be found in EN 16186-2.

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 system - Part 1 Heavy rail*

IEC 60050-845:1987+A1:2016,[1] *International Electrotechnical Vocabulary Chapter 845: Lighting*

EN 62031:2008+A2:2015, *LED modules for general lighting - Safety specifications*

EN 62471:2008, *Photobiological safety of lamps and lamp systems*

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

IEC/TR 62778:2014, *Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires*

[1] IEC 60050-845:1987+A1:2016 is identical to CIE Publication No. CIE S 017/E:2011.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 https://www.iso.org/obp

NOTE Definitions 3.1.1 to 3.1.5 from CEN-CENELEC Guide 26.

3.1 General

3.1.1
urban guided transport (UGT) systems
system covering metro, tram and light rail, and defined as public transport systems permanently guided at least by one rail, intended for the operation of local, urban and suburban passenger services with self-propelled vehicles and operated either segregated or not from general road and pedestrian traffic

3.1.2
metro system
UGT system operated on its own right of way and segregated from general road and pedestrian traffic; consequently designed for operations in tunnels, viaducts or on surface level but with physical separation in such a way that inadvertent access is not possible

Note 1 to entry: In different parts of the world, Metro systems are also known as the underground, the subway or the tube. Rail systems with specific construction issues operating on a segregated guideway (e.g. monorail, rack railways) are also treated as metros as long as they are designated as part of the urban public transport network.

3.1.3
tram
UGT system not segregated from general road and pedestrian traffic, which shares its right of way with general road and/or pedestrian traffic and is therefore embedded in its relevant national road traffic legislation (highway codes and specific adaptations)

3.1.4
light rail
UGT system operated on parts of the system not segregated from general road and pedestrian traffic, and on parts of the system with segregated right-of-way; the segregation may include some sections of line where inadvertent access is not possible

3.1.5
local rail system
system connecting city centres with their suburban hinterland or regional local centres, operated on rights of way which are basically segregated from general road and/or pedestrian traffic and/or which can be declared by law as independent from the public environment even if they are not segregated by location, form of construction or appropriate measures

Note 1 to entry: Local rail systems, by national decision complying with Article 1.3 (a) or (b) of Directive 2008/57/EC, may be excluded from the European Community Rail System.

Note 2 to entry: For historical reasons local rail systems may be strongly influenced by conventional railway parameters and their operations procedures.

3.1.6
vehicle
complete assembly of one or more cars

3.1.7
passenger area
area inside the vehicle dedicated to transporting passengers

Note 1 to entry: This definition is derived from EN 15663:2017+A1:2018.

3.1.8
service area
area that is intended to be occupied by service personnel only

3.1.9
seating area
passenger area intended for seated persons

Note 1 to entry: This excludes tip-up seats.

3.1.10
standing area
unobstructed part of a passenger area which can be used by standing persons (e.g. vestibules, aisles), or standing persons at the location of tip-up seats, or wheelchair users

Note 1 to entry: This definition is derived from EN 15663:2017+A1:2018.

Note 2 to entry: Wheelchairs occupy the same floor space as standing persons in urban rail vehicles.

3.1.11
open gangway
wide gangway designed to be occupied by travelling passengers

Note 1 to entry: This excludes the gangways that are only to be used to pass from one car to another.

3.1.12
vehicle access step
first fixed part of the floor threshold inside the vehicle

3.1.13
lamp
light source used for the creation of light in a luminaire

Note 1 to entry: Lamps include tungsten, halogen, fluorescent, electroluminescent, LED, OLED and laser diode technologies.

3.1.14
luminaire
complete assembly with associated fixings, fittings and electrical connections for the control of light delivery, excluding the lamp or lamps

Note 1 to entry: A more detailed definition is given in EN 12665, and the ILV item 17–707.

3.1.15
luminance
L
luminous intensity of the light emitted in a given direction from an element of a surface, divided by the area of the element projected in the same direction

Note 1 to entry: Unit: candela per square metre (cd/m^2).

Note 2 to entry: A more detailed definition is given in EN 12665, and the ILV item 17–711.

3.1.16
luminous flux
Φ
quantity derived from radiant flux (radiant power) by evaluating the radiation according to the spectral sensitivity of the human eye (as defined by the CIE standard photometric observer)

Note 1 to entry: Unit: lumen (lm).

Note 2 to entry: It is the light power emitted by a source.

Note 3 to entry: Adapted from EN 12665.

3.1.17
Illuminance
E

ratio of the luminous flux incident on a surface to the area of the illuminated surface

Note 1 to entry: Unit: lux (lx) = lm/m^2

Note 2 to entry: Illuminance was previously known as the illumination level or value.

Note 3 to entry: The orientation of the surface may be defined, e.g. horizontal, vertical.

3.1.18
average illuminance
E_{av}
illuminance averaged over the specified surface

Note 1 to entry: Unit: lux (lx).

Note 2 to entry: Adapted from EN 12665.

Note 3 to entry: In practice this may be derived either from the total luminous flux falling on the surface divided by the total area of the surface, or alternatively from an arithmetic average of the illuminances at a representative number of points on the surface.

3.1.19
illuminance uniformity
ratio of the least favourable illuminance to the average illuminance within the specified measurement surface

Note 1 to entry: The least favourable illuminance may be either the minimum or maximum illuminance over all the measurement points.

3.1.20
correlated colour temperature
T_{cp}
CCT
temperature of the Planckian radiator whose perceived colour most closely resembles that of the given stimulus at the same brightness and under specified viewing conditions

Note 1 to entry: Unit: Kelvin (K).

Note 2 to entry: Adapted from EN 12665.

Note 3 to entry: A more detailed definition is given in ILV item 17–258.

3.1.21
colour rendering
effect of an illuminant on the reflective colour of objects by comparison with their reflective colour under a reference light source

Note 1 to entry: Adapted from IEC 60050-845-02–59:1987+A1:2016.

3.1.22
light loss factor
ratio of the average illuminance of the illuminated surface after a certain period of use of a lighting installation to the average illuminance obtained under the same conditions for the installation considered conventionally as new

Note 1 to entry: Adapted from IEC 60050-845-09–59:1987+A1:2016.

3.1.23
SDCM
standard deviation colour matching
deviation, defined in terms of just perceptible colour differences using 'MacAdam ellipses' as defined in the CIE 1964 colour space

Note 1 to entry: The SDCM scale, runs from 0 to 10, where 1–3 normally covers environments with high demands on colour matching.

Note 2 to entry: The CIE 1964 colour space, also known as CIEUVW, permits analysis of colour difference using the SDCM method

3.1.24
contractor
organizations responsible for

— the design, manufacture or supply of the lighting system (may also be referred to as the 'supplier'); and

— the purchase, installation or use of the lighting system (may also be referred to as the 'customer')

3.2 Types of lighting

3.2.1
general lighting
lighting of an interior provided for normal operation