SLOVENSKI STANDARD
SIST EN 15153-1:2020

01-marec-2020

Nadomešča:
SIST EN 15153-1:2013+A1:2016

Železniške naprave - Zunanje vidne in zvočne opozorilne naprave - 1. del: Čelne, označevalne in sklepne luči za železniška vozila za višje osne pritiske

Railway applications - External visible and audible warning devices - Part 1: Head, marker and tail lamps for heavy rail

Bahnanwendungen - Äußere optische und akustische Warneinrichtungen - Teil 1: Leuchten für Fernlichter, Spitzen- und Schlusssignale für Vollbahnen

Applications ferroviaires - Dispositifs externes d'avertissement optiques et acoustiques - Partie 1 : Feux avant, feux de position et feux arrière pour systèmes ferroviaires lourds

Ta slovenski standard je istoveten z: **EN 15153-1:2020**

ICS:

45.060.10	Vlečna vozila	Tractive stock

SIST EN 15153-1:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15153-1

January 2020

ICS 45.060.10

Supersedes EN 15153-1:2013+A1:2016

English Version

Railway applications - External visible and audible warning devices - Part 1: Head, marker and tail lamps for heavy rail

Applications ferroviaires - Dispositifs externes d'avertissement optiques et acoustiques - Partie 1 : Feux avant, feux de position et feux arrière pour systèmes ferroviaires lourds

Bahnanwendungen - Äußere optische und akustische Warneinrichtungen - Teil 1: Leuchten für Fernlichter, Spitzen- und Schlusssignale für Vollbahnen

This European Standard was approved by CEN on 6 October 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 15153-1:2020 E

Contents

Page

European foreword

This document (EN 15153-1:2020) 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 2020, and conflicting national standards shall be withdrawn at the latest by July 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 supersedes EN 15153-1:2013+A1:2016.

The main changes with respect to the previous edition are:

— clarification of scope,

— revised alignment of head lamps according to the ‘alternative method’,

— clarification of the criteria for assessing the lit area of lamps,

— new Annex A, containing a summary of items for agreement between contractors, and

— re-working of the summary of testing requirements (now Annex B) to permit inspection of drawings / design documents, and to mandate the testing of interoperability constituents.

This series of documents *Railway applications — External visible and audible warning devices* consists of the following parts:

— Part 1*: Head, marker and tail lamps for heavy rail* (this document);

— Part 2*: Warning horns for heavy rail;*

— Part 3*: Visible warning devices for urban rail;*

— Part 4*: Audible warning devices for urban rail.*

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 2016/797/EC.

For relationship with EU Directive 2016/797/EC, see informative Annex ZA which is an integral part of this document.

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 was produced following the creation of EN 15153-3 for urban rail.

This document was re-named to make a clear distinction between heavy rail and urban rail.

Additionally, Annex ZA was updated for the current status of TSIs.

1 Scope

This document defines the functional and technical requirements for head, marker and tail lamps for heavy rail units, excluding road, metro and self-contained systems.

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

Lamps designed for special purposes, for example illumination of third rail, are excluded from the scope of this document.

Portable lamps are excluded from the scope of this document.

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 16186-2:2017, *Railway applications - Driver's cab – Part 2: Integration of displays, controls and indicators*

EN ISO/CIE 11664-1:2019, *Colorimetry — Part 1: CIE standard colorimetric observers*

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 For general railway terms and definitions, refer to EN 17343[1].

3.1
heavy rail systems
see EN 17343[1]

3.2
head lamp
device fitted to the front of the train that emits white light, intended to provide visual warning of an approaching train, and/or to illuminate the line and lineside

3.3
marker lamp
device fitted to the front of the train that emits white light, intended to indicate the presence of a train, to provide visual warning of an approaching train and/or to illuminate retro-reflective lineside signs

Note 1 to entry: The front end signal light (detectability) as set out in TSI OPE comprises three marker lamps.

[1] Under preparation. Stage at the time of publication: prEN 17343.

3.4
tail lamp
device fitted to the rear of the train that emits red light, intended to indicate the presence of a train, and to indicate the end of the complete train formation

Note 1 to entry: The rear end signal light as set out in TSI OPE comprises two tail lamps.

3.5
combined lamp
device capable of different functions, for example head, marker and tail lamp, or any combination of these

3.6
light source
system for generating light in a lamp

3.7
CIE (1931) standard colorimetric system (x, y, z)
system for specifying colour by determining the tristimulus values of the spectral power distribution of a coloured light using the set of reference colour stimuli [X], [Y], [Z] and the three CIE colour matching functions x(λ), y(λ), z(λ), adopted by the CIE in 1931

Note 1 to entry For more information see CIE 15.

3.8
optical axis of lamp
axis defined by the manufacturer against which the luminous intensity requirements are assessed

3.9
centre-line of rails
line parallel and equidistant to the rails

Note 1 to entry: This definition was derived from EN 13232-1:2003, with modifications.

3.10
lit area
active optical area of a lamp projected onto a plane perpendicular to the optical axis

3.11
contractor
organizations responsible for

— the design, manufacture or supply of the lamp (may also be referred to as the ‘supplier’); and

— the purchase, installation or use of the lamp (may also be referred to as the ‘customer’).

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

cd	Candela, the SI unit for luminous intensity
CIE	International Commission on Illumination

RST	Rolling Stock
TSI	Technical Specification for Interoperability relating to the rolling stock subsystem of the trans-european rail system network

5 Requirements

5.1 General

The provision of lamps is specified in 5.2.

The technical requirements for head, marker and tail lamps are set out in 5.3, 5.4 and 5.5 (respectively).

The testing requirements are set out in Clause 6 and Annex B.

It should be noted that certain lighting technology degrades throughout its service life. It is important to ensure that the requirements in this document are maintained.

5.2 Provision of lamps

A minimum of two white head lamps shall be installed at the front of the train.

Additionally, where agreed between contractors, a maximum of two upper head lamps may be installed.

Three white marker lamps shall be installed at the front of the train.

Two red tail lamps shall be installed at the rear of the train.

Where agreed between contractors, additional tail lamp(s) and marker lamp(s) with special warning or signalling functions may be installed, provided that they comply with the prescribed optical requirements and that they do not adversely affect the parameters given in this document.

Combined lamps (i.e. lamps capable of different functions) are permissible, provided that the requirements for individual lamp functions are achieved.

All lamps at intermediate locations of the train shall be unlit.

5.3 Head lamps

5.3.1 Positioning of head lamps

The two head lamps shall both be located at the same height, with their geometric centres between 1 500 mm and 2 000 mm above the top of rail.

NOTE Where upper head lamps are fitted, this requirement applies only to the lower head lamps.

The arrangement of the two head lamps shall be such that the distance between their geometric centres is not less than 1 000 mm and that the head lamp geometric centres are symmetrical about the centre-line of rails.

Where upper head lamps are installed, these shall be located as close to the vehicle centre line as possible.

The vertical separation between the geometric centres of all upper lamp(s) and all lower lamps shall be equal to or greater than 600 mm.

5.3.2 Dimensions of head lamps

Each head lamp shall have a maximum lit area of 33 400 mm^2, and a minimum lit area of 17 650 mm^2.

In the case of non-circular head lamps, the minimum dimension of the lit area shall be 110 mm. This requirement shall be demonstrated by analysis or testing with a circular area with a diameter of 110 mm which fits within the lit area.

NOTE The intention of the minimum dimension is to prohibit extremely narrow (non-circular) shapes of head lamps and to permit irregular shapes provided that they display a proper representation of the lamp at a representative distance, e.g. 50 m.

The whole of the head lamp area shall appear to be lit when arranged in the installed condition and viewed from a distance of 50m along the optical axis.

5.3.3 Colour of head lamps

The colour of light emitted by head lamps, when measured in accordance with 6.3, shall lie within the colour space defined by the intersection points as given in Table 1, and illustrated in Figure 1.

Table 1 — Chromaticity coordinates of the intersection points of the colour specification for head lamps

Colour of head lamp	CIE (1931) chromaticity coordinates of the intersection points						
White	Point	I*	J	J'	K'	K	L*
	x	0,310	0,440	0,500	0,500	0,440	0,310
	y	0,348	0,432	0,440	0,382	0,382	0,283
NOTE This specification is based on CIE S 004 White Class B with a restricted blue limit. The chromaticity coordinates indicated with * define the restricted blue limit.							

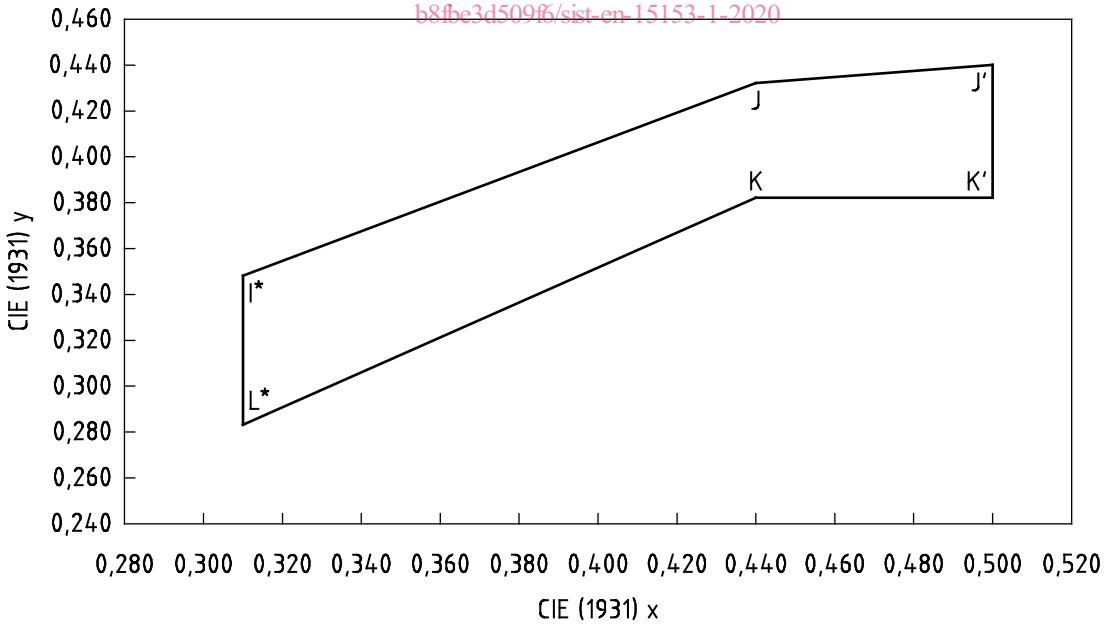

Figure 1 — Chromaticity diagram to illustrate the colour specification for head lamps according to Table 1

Where agreed between contractors, the spectral radiation distribution requirements of 5.4.3.2 shall apply to head lamps.

5.3.4 Luminous intensity of head lamps

The luminous intensities of individual head lamps shall be as shown in Table 2.

Table 2 — Luminous intensities of head lamps

Head lamp function	Dimmed head lamp, and upper head lamp where provided	Full-beam head lamp
Luminous intensity (cd) measured along the optical axis of the head lamp	12 000 to 16 000	40 000 to 70 000
Luminous intensity (cd) within 5° on either side of the optical axis in the horizontal plane	> 3 000	> 10 000

By agreement between contractors, for vehicles outside the scope of the TSI LOC&PAS, it is permissible to provide only one head lamp function (dimmed or full-beam).

NOTE The use of either dimmed or full beam will be dependent on Operational Rules in each Member State.

Secondary intensity maxima are permitted within ± 5° of the optical axis in the horizontal plane, provided that:

a) the maximum specified on-axis intensity is not exceeded,

and

b) the difference between the intensities of any adjacent secondary maximum and minimum is no greater than 10 % of the luminous intensity measured along the optical axis of the head lamp.

Concerning the control of glare, three options are permissible:

Option (1): the maximum luminous intensities for each angle above the optical axis in the horizontal plane parallel to the centre-line of rails, in the installed condition following any necessary adjustment as defined in 5.3.5, shall be as shown in Table 3.

Table 3 — Luminous intensities along set angles for full-beam and dimmed head lamps

Angle above the horizontal axis of head lamp in the vertical plane °	Maximum luminous intensity of head lamp at specified angle cd
0,25	58 400
0,50	14 600
1,00	3 650
1,50	1 620
2,00	912

Option (2): In the case of head lamps designed to Table 2 but not Table 3 the control of glare may be achieved by the adjustment of the downwards vertical alignment of the head lamps when installed on