



**SLOVENSKI STANDARD**  
**SIST EN 15153-1:2013+A1:2016**  
**01-december-2016**

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**Železniške naprave - Zunanje vidne in zvočne opozorilne naprave za vlake - 1. del:  
Čelne, označevalne in sklepne luči**

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

Bahnanwendungen - Optische und akustische Warneinrichtungen für Schienenfahrzeuge  
- Teil 1: Fernlichter, Spitzensignale und Zugschlussignale

Applications ferroviaires - Dispositifs externes d'avertissement optiques et acoustiques  
pour les trains - Partie 1: Signaux de face avant, signaux d'extrémité avant et signaux de  
face arrière

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EUROPEAN STANDARD

EN 15153-1:2013+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

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

Applications ferroviaires - Dispositifs externes d'avertissement optiques et acoustiques pour les trains  
- Partie 1: Signaux de face avant, signaux d'extrémité avant et signaux de face arrière

Bahnanwendungen - Optische und akustische Warneinrichtungen für Schienenfahrzeuge - Teil 1: Fernlichter, Spitzensignale und Zugschlussignale

This European Standard was approved by CEN on 27 October 2012 and includes Amendment 1 approved by CEN on 25 July 2016.

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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 15153-1:2013+A1:2016) 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of an identical text or by endorsement, at the latest by April 2017, and conflicting national standards shall be withdrawn at the latest by April 2017.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 includes Amendment 1 approved by CEN on 2016-07-25.

This document supersedes A1 EN 15153-1:2007 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

A1 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. A1

The main changes with respect to the previous edition are:

- technical requirements have been brought in line with the conventional TSIs, and
- requirements have been revised to permit new technologies.

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

- *Part 1: Head, marker and tail lamps* (the present document);
- *Part 2: Warning horns*.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15153-1:2013+A1:2016 (E)

## Introduction

This European Standard was produced following a review of EN 15153-1:2007 to incorporate the requirements of rolling stock TSIs.

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## 1 Scope

This European Standard defines the functional and technical requirements for head, marker and tail lamps for trains, including high speed and conventional rail, but excluding road, metro and self-contained systems.

This European Standard also defines the requirements for testing and conformity assessment.

Portable lamps are excluded from the scope of this European Standard.

## 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.

**A1** prEN 16186-2:2015, *Railway applications — Driver's cab — Part 2: Integration of displays, controls and indicators* **A1**

CIE 15, *Colorimetry*<sup>1)</sup>

CIE 69, *Methods of characterizing illuminance meters and luminance meters; performance, characteristics and specifications*<sup>1)</sup>

CIE 70, *The measurement of absolute luminous intensity distributions*<sup>1)</sup>

ISO 11664-1 (CIE S 014-1/E), *Colorimetry — Part 1: CIE standard colorimetric observers*<sup>1)</sup>

NOTE ISO 11664-1 was previously published as ISO 10527:2007, which has been withdrawn.

## 3 Terms and definitions

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

### 3.1

#### **high speed train**

train which is designed to operate at speeds equal to or greater than 190 km/h

Note 1 to entry: This includes Class 1 and Class 2 high speed trains as defined in the HS RST TSI.

### 3.2

#### **conventional train**

train which is designed to operate at a maximum speed lower than 190 km/h and designed to travel on all or part of the conventional lines of the TEN (Trans-European rail system Network)

Note 1 to entry: See also CR LOC&PAS TSI, §2.1 (Locomotives and Passenger Rolling Stock).

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<sup>1)</sup> Available from: International Commission of Illumination, CIE Central Bureau, Kegelgasse 27, A-1030 Wien.

**EN 15153-1:2013+A1:2016 (E)****3.3****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 lineside

**3.4****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

**3.5****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

**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  $x(\lambda)$ ,  $y(\lambda)$ ,  $z(\lambda)$ , adopted by the CIE in 1931 (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

[SOURCE: EN 13232-1:2003, modified]

**3.10****lit area**

active optical area of a lamp projected into a plane perpendicular to the optical axis

**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
CR	Conventional Railway
HS	High Speed railway
LED	Light Emitting Diode
RST	Rolling Stock
TEN	Trans-European rail system Network



TSI	Technical Specification for Interoperability relating to the rolling stock subsystem of the TEN
UIC	International Union of Railways

## 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 A.

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

### 5.2 Provision of lamps

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

Additionally, and only by agreement with the 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.

Only by agreement with the 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 European Standard.

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 upper surface of the rail.

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 above the windscreen, as close to the vehicle centre line as possible.

#### 5.3.2 Dimensions of head lamps

Each head lamp shall have a maximum lit area of 33 400 mm<sup>2</sup>, a minimum lit area of 17 650 mm<sup>2</sup> and a minimum dimension of this lit area of 110 mm.

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

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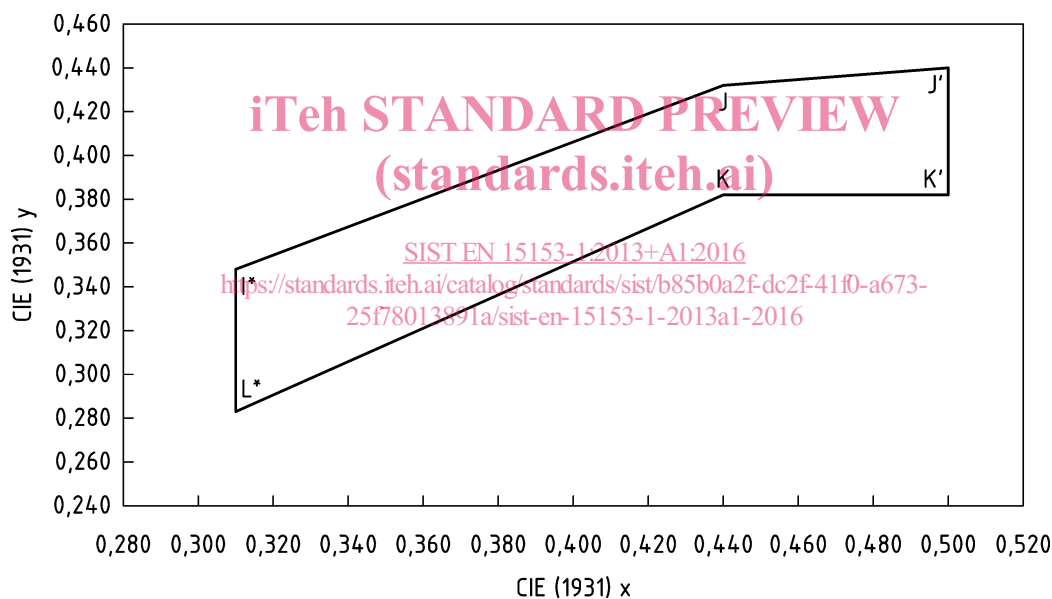
## 5.3.3 Colour of head lamps

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 — The 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						
	Point	I*	J	J'	K'	K	L*
White	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  $\boxed{A_1}$  5.4.3.2  $\boxed{A_1}$  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

In the case of head lamps on conventional trains, only one head lamp function (dimmed or full-beam) is required.

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

Where upper head lamps are installed, the characteristics of these head lamps may deviate from the requirements of this European Standard.

Secondary intensity maxima are permitted within  $\pm 5^\circ$  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, 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 [A1](#) 5.3.5 [A1](#), 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

An alternative control of glare is the adjustment of the downwards vertical alignment of the head lamps when installed on the vehicle, such that the vertical illuminance from each head lamp at the upper surface of the rails at a distance of 100 m is less than 0,5 lux. In this case, the requirements of Table 3 may not apply.