# SLOVENSKI STANDARD
# SIST EN 15153-1:2007

**01-september-2007**

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**Železniške naprave - Zunanje vidne in zvočne opozorilne naprave vlakov za visoke hitrosti – 1. del: Čelne, označevalne in sklepne luči**

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

Bahnanwendungen - Optische und akustische Warneinrichtungen für Hochgeschwindigkeitszüge - Teil 1: Fernlicht, Spitzensignal und Zugschlusssignal



Applications ferroviaires - Dispositifs d'avertissement optiques et acoustiques pour trains a grande vitesse - Partie 1: Signaux de face avant, signaux d'extrémité avant et signaux de face arriere



**Ta slovenski standard je istoveten z:** **EN 15153-1:2007**

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**ICS:**

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| 03.220.30 | Železniški transport | Transport by rail |
| 93.100 | Gradnja železnic | Construction of railways |

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EUROPEAN STANDARD

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# EN 15153-1

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English Version

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

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

Bahnanwendungen - Optische und akustische Warneinrichtungen für Hochgeschwindigkeitszüge - Teil 1: Fernlicht, Spitzensignal und Zugschlusssignal

This European Standard was approved by CEN on 15 March 2007.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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# Foreword

This document (EN 15153-1:2007) 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 November 2007, and conflicting national standards shall be withdrawn at the latest by November 2007.

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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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

— *Part 1: Head, marker and tail lamps*

— *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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

# 1 Scope

This European Standard defines the functional, operational and technical requirements for head, marker and tail lamps for high speed trains, including the requirements for testing and conformity assessment.

# 2 Normative references

The following referenced documents are indispensable for the application 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.

CIE 15, *Colorimetry*[1)]

CIE 69, *Methods of characterizing illuminance meters and luminance meters; performance, characteristics and specifications*[1)]

CIE 70, *The measurement of absolute luminous intensity distributions* [1)]

CIE S 004, *Colours of light signals* [1)]

ISO/CIE 10527, *CIE standard colorimetric observers* [1)]



# 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 This includes class 1 and class 2 high speed trains as defined in the HS TSI RS.

**3.2**
**head lamp**
white light on the front end of a train, intended to provide visual warning of an approaching train, and to illuminate the lineside

**3.3**
**marker lamp**
white signal light on the front end of a train, intended to indicate the presence of a train

**3.4**
**tail lamp**
a red signal light on the rear end of a train, intended to indicate the presence of a train

**3.5**
**light source**
system for generating light in a lamp

1) To be purchased from: International Commission of Illumination, CIE Central Bureau, Kegelgasse 27, A-1030 Wien

**3.6**
**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)

**3.7**
**optical axis of lamp**
axis into which the maximum value of luminous intensity is projected

**3.8**
**centre-line of track**
line parallel to the optical axis of the head light

NOTE Adapted from EN 13232-1: 2003.

## 4 Symbols and abbreviations

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

| | |
|---|---|
| cd | Candela, the SI unit for luminous intensity |
| CIE | International Commission on Illumination |
| HS TSI RS | Technical Specification for Interoperability relating to the rolling stock subsystem of the trans-European high-speed rail system |
| LED | light emitting diode |
| UIC | International Union of Railways |



## 5 Requirements

### 5.1 General

The head, marker and tail lamps specified in Clause 5 of this European Standard shall be lit only at the front and rear ends of the complete train formation.

### 5.2 Provision of lamps

A minimum of two white head lamps and three white marker lamps shall be provided at the front of the train.

Two of these lamps shall be head lamps located on a horizontal axis at the same height above the rail level. A maximum of three white marker lamps shall be provided. Two lower marker lamps shall be located on a horizontal axis at the same height above the rail level. One upper marker lamp shall be located centrally above the lower marker lamps.

A minimum of three white lamps shall be lit at the front end of the train. Combined lamps (i.e. lamps capable of different functions) are permissible provided that the requirements for individual lamp functions are achieved.

Two red tail lamps shall be lit at the rear of the train and shall be located on a horizontal axis at the same height above the rail level.

## 5.3 Head lamps

### 5.3.1 Arrangement of head lamps

The two head lamps shall be located on the same horizontal axis such that their centres are between 1 500 mm and 2 000 mm above rail level.

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

### 5.3.2 Alignment

When fitted to the train, the optical axis of each head lamp shall be parallel to the centre-line of track. Head lamps shall be provided with a means of alignment adjustment.

### 5.3.3 Dimensions of head lamps

Each individual head lamp shall have a maximum lit area of 22 700 $mm^2$ and a minimum dimension of 110 mm.

### 5.3.4 Colour of head lamps

The colour of light emitted by head lamps, measured in accordance with 6.1 of this European Standard, shall comply with the requirements of CIE S 004, as shown in Table 1.



**Table 1 — Colour range intersection point**

| Colour of light | CIE (1931) colour coordinates of the intersection points | | | | |
|---|---|---|---|---|---|
| White Class A | Intersection point | I | J | K | L |
| | x | 0,300 | 0,440 | 0,440 | 0,300 |
| | y | 0,342 | 0,432 | 0,382 | 0,276 |



### 5.3.5 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 | Reduced head lamp | 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) at all angles within 5° on either side of the optical axis in the horizontal plane | > 3 000 | > 10 000 |

Secondary maxima of luminous intensities within ± 5° of the optical axis in the horizontal plane are not allowed.

Concerning glare, the maximum luminous intensities for each angle above the optical axis shall be as shown in Table 3.

**Table 3 — Luminous intensities along set angles**

| Vertical angle of drivers eye above optical axis of head lamp on approaching train<br>° | Maximum luminous intensity of head lamp into specified angle above optical axis<br>cd |
|---|---|
| 0,25 | 58 400 |
| 0,50 | 14 600 |
| 1,00 | 3 650 |
| 1,50 | 1 620 |
| 2,00 | 912 |

## 5.4 Marker lamps

### 5.4.1 Arrangement of marker lamps

The two lower marker lamps shall be located on the same horizontal axis such that their centres are between 1 500 mm and 2 000 mm above rail level.



The arrangement of the two lower marker lamps shall be such that the distance between their centres is not less than 1 000 mm and that the lamp centres are symmetrical about the centre-line of track. The upper marker lamp shall be located centrally above the lower marker lamps with a minimum vertical separation of 600 mm.



### 5.4.2 Dimensions of marker lamps

Each individual marker lamp shall have a maximum lit area of 22 700 $mm^2$ and a minimum dimension of the lit area of 90 mm.

### 5.4.3 Colour of marker lamps

#### 5.4.3.1 General

The colour of light emitted by marker lamps, measured in accordance with 6.1 of this European Standard, shall comply with the requirements of CIE S 004, as shown in Table 4.

**Table 4 — Colour range intersection points**

| Colour of light | CIE (1931) colour coordinates of the intersection points | | | | |
|---|---|---|---|---|---|
| White Class A | Intersection point | I | J | K | L |
| | x | 0,300 | 0,440 | 0,440 | 0,300 |
| | y | 0,342 | 0,432 | 0,382 | 0,276 |