BS EN ISO 15008:2017

BSI Standards Publication

Road vehicles — Ergonomic aspects of transport information and control systems — Specifications and test procedures for in-vehicle visual presentation (ISO 15008:2017)

Documents
Document Sharing Hub

Full document details: BS EN ISO 15008:2017

National foreword

This British Standard is the UK implementation of EN ISO 15008:2017. It supersedes BS EN ISO 15008:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/12, Ergonomics (Road vehicles).

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017.
Published by BSI Standards Limited 2017

ISBN 978 0 580 86378 3

ICS 13.180; 43.040.15

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS EN ISO 15008:2017

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15008

March 2017

ICS 13.180; 43.040.15

Supersedes EN ISO 15008:2009

English Version

Road vehicles - Ergonomic aspects of transport information and control systems - Specifications and test procedures for in-vehicle visual presentation (ISO 15008:2017)

Véhicules routiers - Aspects ergonomiques des systèmes de commande et d'information des transports - Spécifications et modes opératoires pour la présentation visuelle à bord du véhicule (ISO 15008:2017)

Straßenfahrzeuge - Ergonomische Aspekte von Fahrerinformations- und Assistenzsystemen - Anforderungen und Bewertungsmethoden der visuellen Informationsdarstellung im Fahrzeug (ISO 15008:2017)

This European Standard was approved by CEN on 25 February 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, 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: Avenue Marnix 17, B-1000 Brussels

© 2017 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN ISO 15008:2017 E

Documents
Document Sharing Hub

Full document details: BS EN ISO 15008:2017

European foreword

This document (EN ISO 15008:2017) has been prepared by Technical Committee ISO/TC 22 "Road vehicles" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

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 September 2017, and conflicting national standards shall be withdrawn at the latest by September 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 supersedes EN ISO 15008:2009.

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

Endorsement notice

The text of ISO 15008:2017 has been approved by CEN as EN ISO 15008:2017 without any modification.

Documents
Document Sharing Hub

Full document details: BS EN ISO 15008:2017

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Requirements and measurement methods ... **4**
4.1 General ... 4
4.2 Design viewing position and illumination range ... 5
4.2.1 Design viewing position ... 5
4.2.2 Illumination range ... 7
4.3 Display illumination, minimum contrast, luminance and polarity ... 7
4.3.1 Display illumination ... 7
4.3.2 Minimum contrast ratio ... 7
4.3.3 Display mode ... 10
4.4 Colour combinations ... 10
4.5 Alphanumerical character dimensions ... 11
4.5.1 General ... 11
4.5.2 Height ... 11
4.5.3 Width by height ratio: Proportion of the typeface ... 11
4.5.4 Stroke width by height ratio: Weight of the typeface ... 12
4.5.5 Spacing ... 12
4.5.6 Case ... 13
4.6 Pixel matrix character format ... 14
4.6.1 Upper and lower case of alphanumeric Latin, Greek, Cyrillic characters ... 14
4.6.2 Automotive symbols ... 15
4.6.3 Non-Latin characters ... 16
4.7 Reflections and glare ... 16
4.8 Characteristics of presentation ... 16
4.8.1 Image instability ... 16
4.8.2 Image flashing ... 16
4.9 Redundant information displays ... 17
Annex A (normative) **Definition and measurement of character dimensions** ... **18**
Annex B (informative) **Colour combinations** ... **20**
Annex C (informative) **Terminology of typographic terms and visual dictionary** ... **21**
Bibliography ... **25**

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 39, *Ergonomics*.

This third edition cancels and replaces the second edition (ISO 15008:2009), which has been technically revised with the following changes:

— Introduction was modified;

— Scope was modified (heavy vehicles partly excluded);

— test conditions for direct sunlight have been changed;

— character height was modified;

— character proportion was modified;

— character weight criterion was modified;

— intercharacter spacing was modified;

— word spacing was modified;

— a new subclause on text case was added;

— the subclause on character outlines was modified;

— a new subclause on character shadows was added;

— the subclause on Non-Roman text was modified and renamed Non-Latin.

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017

Introduction

Driving is a complex task requiring continuous allocation of attentional resources to both driving and non-driving tasks. Because of this, driving is an interactive balance between cognitive, physical, somatosensory, visual and psychomotor skills.

Driver and vehicle form an integrated system that includes the environment, vehicle controls, and displays collectively defined as the transport information and control systems (TICS). Since driving is an interactive systems activity, vehicle characteristics in combination with human capabilities constitute important factors in the performance of this TIC system.

In order to achieve optimal driver performance, the purpose of TICS is to support drivers in their primary task such that performance, comfort and safety are increased and overall driver workload is not negatively influenced by the use of TICS. One set of factors influencing this process involves the characteristics of visual displays. Specifically, those aspects of displays designed to accommodate human capabilities, the range of illumination conditions and location of the display with respect to the driver. This is especially important since visual specifications must include a wide range of environmental conditions and constitute only one necessary condition for adequate performance, comfort and workload. The purpose of this document is to standardize visual presentation.

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017

Documents
Document Sharing Hub

INTERNATIONAL STANDARD ISO 15008:2017(E)

Road vehicles — Ergonomic aspects of transport information and control systems — Specifications and test procedures for in-vehicle visual presentation

1 Scope

This document specifies minimum requirements for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a passenger car by on-board transport information and control systems (TICS) used while the vehicle is in motion. Heavy vehicles are excluded for the requirements of contrast and font size since these chapters reference ISO 4513 which is only applicable for passenger vehicles. These requirements are intended to be independent of display technologies. Reference to test methods and measurements for assessing compliance with them have been included where necessary.

This document is applicable mainly to perceptual, and some basic cognitive, components of the visual information, including character legibility and colour recognition. It is not applicable to other factors affecting performance and comfort, such as coding, format and dialogue characteristics, or to displays using:

— characters presented as a part of a symbol or pictorial information (e.g.CD symbol);

— superimposed information on the external field (e.g. head-up displays);

— pictorial images (e.g. rear view camera);

— maps and topographic representations (e.g. those for setting navigation systems); or

— quasi-static information (e.g. AM/PM, km/miles, kPa/PSI, On/Off information).

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.

ISO 4513, *Road vehicles — Visibility — Method for establishment of eyellipses for driver's eye location*

CIE 85:1989, *Solar spectral irradiance*

SAE J1757/1:2015, *Standard Metrology for Vehicular Displays*

CIE S 017/E:2011 ILV, *International lighting vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CIE S 017/E:2011 ILV and the following 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 http://www.iso.org/obp

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017

3.1
adaptation
adjustment of the eye's sensitivity to the *brightness* (3.2) of the observed visual field by chemical and physical processes within the eye

Note 1 to entry: Dark adaptation occurs at a slower rate than does light adaptation.

3.2
brightness
subjective attribute of light sensation by which a stimulus appears to be more or less intense or to emit more or less light

3.3
chromatic
having hue or being coloured, appearing different in quality from a neutral grey having the same *brightness* (3.2)

Note 1 to entry: It is related to the colour properties of a visual stimulus.

3.4
contrast ratio
R_C
ratio between the luminance L_{high} and the luminance L_{low}

Note 1 to entry: $R_C = \frac{L_{high}}{L_{low}}$.

Note 2 to entry: Terms and definitions related to photometric quantities (e.g. illuminance, luminance, luminance contrast and saturation) are given in CIE S 017/E:2011 ILV. In CIE S 017/E:2011 ILV, it is referred as luminance contrast ratio.

3.5
critical specular line
CSL
line from the centre of the display to the centre of the *eyellipse* (3.10)

3.6
cyclopean eyellipse
elliptical volume combining the left and the right *eyellipse* (3.10) of the driver into one single volume located in the centre between them

3.7
day condition
condition with diffuse ambient light

3.8
direct sunlight condition
condition under which the viewing conditions are mainly influenced by direct light from the sun on the display surface

3.9
dynamic information
information that has more than two stages of change

3.10
eyellipse
elliptical shape of the driver eye range

Note 1 to entry: As defined in ISO 4513.

Note 2 to entry: See definition of 95th percentile eyellipse in ISO 4513.

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017

Note 3 to entry: It is the contraction of the words “eye” and “ellipse”.

3.11
flash
intended periodic variation of the luminance of a light or visual information, normally from “OFF” to a given value, typically used for attracting attention

Note 1 to entry: Terms and definitions related to photometric quantities (e.g. illuminance, luminance, luminance *contrast ratio* (3.4), saturation) are given in CIE S 017/E:2011 ILV.

3.12
flicker
unintended perceived temporal variation of the *brightness* (3.2) of a visual stimulus, usually generated by refresh process of the display content or by variation of the luminance of the backlight

Note 1 to entry: Terms and definitions related to photometric quantities (e.g. illuminance, luminance, luminance *contrast ratio* (3.4), saturation) are given in CIE S 017/E:2011 ILV.

3.13
disability glare
dazzling or disabling effect produced by a bright light

Note 1 to entry: This is a retinal effect, primarily caused by light scatter in the eye, which produces a luminous veil over the retinal image and thus reduces contrast.

3.14
discomfort glare
distracting or disrupting effect of bright point sources in the field of view

Note 1 to entry: This is a perceptual effect, interfering with visual attention and selection.

3.15
jitter
unintended periodic movement of an image or parts of it

3.16
legibility
visual properties of a character or graphics representation that determine the ease with which it can be recognized

Note 1 to entry: See also *readability* (3.21).

3.17
map
representation on plane surface of the features of a connected part of the earth surface (especially of the road and traffic environment), shown in their representative forms, sizes and relationship in accordance with some convention of representation

3.18
night condition
condition of low ambient illumination under which the *adaptation* (3.1) level of the driver is mainly influenced by the portion of the road ahead covered by the vehicle’s own headlights and surrounding street lights, and display and instrument *brightness* (3.2)

Note 1 to entry: Low ambient illumination is less than 50 lx.

3.19
pixel
smallest selectively addressable element of the display surface capable of reproducing the full range of luminance and colours

Note 1 to entry: “Pixel” is an abbreviated term for “picture element”.

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS EN ISO 15008:2017