

SLOVENSKI STANDARD

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Nadomešča:

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Železniške naprave - Komunikacijski, signalni in procesni sistemi - Evropski sistem za vodenje železniškega prometa - Vmesnik človek-stroj - 1. del: Splošna načela za prikaz informacij ERTMS/ETCS/GSM-R

Railway applications - Communication, signalling and processing systems - European Rail Traffic Management System - Driver-Machine Interface - Part 1: General principles for the presentation of ERTMS/ETCS/GSM-R information

Bahnanwendungen - Telekommunikationstechnik, Signaltechnik und Datenverarbeitungssysteme - Europäisches Leitsystem für den Schienenverkehr - Mensch-Maschine Schnittstelle - Teil 1: Ergonomische Grundsätze für die Darstellung von ERTMS/ETCS/GSM-R Informationen

Applications ferroviaires - Systèmes de signalisation, de télécommunications et de traitement - Système européen de gestion du trafic ferroviaire - Interface de conduite - Partie 1: Principes généraux pour la présentation des informations ERTMS/ETCS/GSM-R

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13.180	Ergonomija	Ergonomics
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade

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English Version

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This Technical Specification was approved by CENELEC on 2015-07-20.

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CLC/TS 50459-1:2015

European foreword

This document (CLC/TS 50459-1:2015) has been prepared by CLC/SC 9XA “Communication, signalling and processing systems”, of Technical Committee CENELEC TC 9X “Electrical and electronic applications for railways”.

This document supersedes CLC/TS 50459-1:2005.

CLC/TS 50459-1:2015 includes the following significant technical changes with respect to CLC/TS 50459-1:2005:

- update general principles for the presentation of ERTMS/ETCS/GSM-R information correlated with ERA_ERTMS_015560;
- update ergonomic arrangements with EN 16186 series.

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

This document should be read in conjunction with ERA_ERTMS_015560 “*ETCS Driver Machine Interface*” and EN 16186 series, “*Railway applications — Driver's Cab*”.

CLC/TS 50459 series consists of the following parts under the general title “*Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface*”:

- *Part 1: General principles for the presentation of ERTMS/ETCS/GSM-R information;*
- *Part 2: Ergonomic arrangements of GSM-R information¹⁾;*
- *Part 3: Ergonomic arrangements of non ETCS information¹⁾.*

1) At final draft stage.

Introduction

CLC/TS 50459 series contains the ergonomic arrangements of information on the ERTMS/DMI Display (CCD and TRD). Most items are illustrated with an example.

The reasons for defining the ergonomics of the DMI are as follows:

- achieving harmonized and coherent presentation for ERTMS/ETCS and NTC information. Given the large number of NTC's requiring the use the ERTMS/ETCS DMI, only a harmonized approach is feasible;
- defining Driver-Machine Interface ergonomics that is compatible with agreed interoperable ERTMS specifications;
- to reduce the risk of incorrect operation by a driver;
- facilitating train operation with a unified ergonomics, hence reducing the cost of driver training;
- better understanding of the tasks to be performed;
- increasing speed and accuracy of driver actions.

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CLC/TS 50459-1:2015

1 Scope

This Technical Specification describes from an ergonomic point of view how ERTMS and non-ERTMS information will be arranged and displayed. More specifically, it covers information that is out of the scope of ERA_ERTMS_015560. This Technical Specification describes more ergonomic details than currently provided by the ERTMS/GSM-R specifications.

This Technical Specification defines the ergonomics for the Driver-Machine Interface (DMI) for the following applications:

- stand-alone ERTMS/GSM-R Train Radio Systems;
- non-ERTMS/ETCS Train Control Systems;
- other technical systems currently provided on the rolling stock.

The ergonomics covers

- the general arrangements (dialogue structure, sequences, layout philosophy, colour philosophy),
- the symbols,
- the audible information,
- the data entry arrangements.

This Technical Specification is limited to ergonomic considerations and does not define the technology to be used for the implementation but it does give guidelines about how to implement the requirements using different technology types (soft keys, touch screen device, LCD, electromechanical instruments, indicator lamps, etc.).

This Technical Specification is applicable to all trains fitted with the ERTMS/ETCS and also to trains fitted with train radio (GSM-R) DMI.

The scope of Part 1 of CLC/TS 50459 is to define ergonomic principles for the interface between the driver and the above listed applications.

TDD is out of scope of CLC/TS 50459 series.

For human factor items, such as display of information, display location, viewing angles and organization of the screens, see EN 16186 series.

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.

ERA_ERTMS_015560, *ETCS Driver Machine Interface*, Version 3.4.0, 2014-05-12

EN 16186-1, *Railway applications – Driver's cab – Part 1: Anthropometric data and visibility*

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

prEN 16186-3, *Railway applications – Driver's cab – Part 3: Design of displays* ²⁾

²⁾ At draft stage.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

3.1.1

activated

put into a functional state following a validated input

3.1.2

button

operating element for interaction with the cab display (hard key, soft key, sensitive area)

3.1.3

cell

basic unit to define the shape of DMI objects and the proportions of areas

3.1.4

ERTMS/ETCS system

system in which ERTMS/ETCS functional, technical and the related operational specifications are determined

3.1.5

ERTMS/GSM-R system

system in which ERTMS/EIRENE functional and system specifications are determined

3.1.6

hard key

physical key with permanent marking and not part of the screen area

Note 1 to entry: This permanent marking may be alpha and/or numeric and/or a symbol.

3.1.7

indicator

element designed to draw attention to a system status

3.1.8

input field

highlighted screen area for entering data

3.1.9

label

symbol or text indication on or close to an indicator or a button

3.1.10

On-Board system

ERTMS/ETCS system and/or the ERTMS/GSM-R system or sub-system located in rolling stock

3.1.11

sensitive area

enabled area on a touchscreen on which a physical action is possible in order to give input to the cab display

3.1.12

soft key

context-dependent key that consists of a hard key with an associated label on the display area

CLC/TS 50459-1:2015**3.1.13****sound group**

set of sounds relating to similar events

3.1.14**symbol**

presentation of information in graphical form instead of using text

3.1.15**title**

text explaining the purpose of the window or screen

3.1.16**window**

separate visual area of the screen that displays information output and may allow input

Note 1 to entry: Usually, it has a rectangular shape.

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

CCD	Command Control Display
DMI	Driver-Machine Interface
EIRENE	European Integrated Railways radio Enhanced Network
ERRI	European Rail Research Institute
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
GSM-R	Global System for Mobile communication – Railways
ISO	International Organization for Standardization
NTC	National Train Control
TDD	Train Diagnostic Display
TRD	Train Radio Display
UIC	Union Internationale des Chemins de Fer
w × h	width by height

4 General ergonomic principles**4.1 Principles for presentation****4.1.1 General**

This subclause provides requirements for the graphical presentation and arrangement of the information shown on the CCD and TRD.

The organization of screen information should comply with the requirements of prEN 16186-3.

The displays shall be located within the maximum reach envelope according to prEN 16186-2:2015, Figure A.1.

The displays should be located within the preferred field of vision according to prEN 16186-2:2015, Figure A.2.

4.1.2 Presentation techniques

4.1.2.1 Emphasizing particular information

To emphasize particular information shown on the DMI, it shall be possible to change the appearance of other areas to make these other areas less conspicuous.

This change of appearance shall be achieved by one or more of the following techniques:

- changing colours;
- changing format.

4.1.2.2 Use of colours

The use of colours shall be according to prEN 16186-3.

4.1.2.3 Use of flashing

The use of flashing shall be according to prEN 16186-3.

4.1.2.4 Use of frames

The use of frames shall be according to prEN 16186-3.

4.1.2.5 Use of highlighting

The use of highlighting shall be according to prEN 16186-3.

4.1.2.6 Use of sound

Sound is used to draw attention to the display.

There are five types of sound:

- 1) feedback sounds;
- 2) ERTMS/ETCS sounds;
- 3) ERTMS/GSM-R sounds;
- 4) NTC sounds;
- 5) sounds for other train functions.

The format of the sounds (except NTC sounds and sounds for other train functions) is described in 4.10.2.

ERA_ERTMS_015560 describes how and when the sounds will be used for ETCS.

CLC/FprTS 50459-2 describes how and when the sounds will be used for GSM-R.

Speech and other audible indications for NTC and other train functions according to standards and National Rules can be used. These indications shall not conflict with sounds defined in this document or other in-cab indications.

NOTE Additional information can be found in prEN 16186-2:2015 and prEN 16186-3.