

SLOVENSKI STANDARD
SIST-TS CLC/TS 50459-1:2021**01-september-2021****Nadomešča:****SIST-TS CLC/TS 50459-1:2015**

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

Ta slovenski standard je istoveten z: CLC/TS 50459-1:2021

ICS:

| | | |
|-----------|----------------------------------|------------------------------|
| 03.220.30 | Železniški transport | Transport by rail |
| 13.180 | Ergonomija | Ergonomics |
| 35.240.60 | Uporabniške rešitve IT v prometu | IT applications in transport |

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CLC/TS 50459-1

March 2021

ICS 03.220.30; 13.180; 35.240.60

Supersedes CLC/TS 50459-1:2015

English Version

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

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This Technical Specification was approved by CENELEC on 2021-02-08.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

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CLC/TS 50459-1:2021**European foreword**

This document (CLC/TS 50459-1:2021) has been prepared by CLC/SC 9XA “Communication, signalling and processing systems”, of Technical Committee CLC/TC 9X “Electrical and electronic applications for railways”.

This document supersedes CLC/TS 50459-1:2015.

CLC/TS 50459-1:2021 includes the following significant technical changes with respect to CLC/TS 50459-1:2015:

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

This document is expected to be read in conjunction with ERA_ERTMS_015560 “*ETCS Driver Machine Interface*” and the EN 16186 series, “*Railway applications — Driver’s Cab*”.

The 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 information;*
- *Part 3: Ergonomic arrangements of non ETCS information.*

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Introduction

The CLC/TS 50459 series contains the ergonomic arrangements for the display of information on the Control and Command Display (CCD) and Train Radio Display (TRD). Most items are illustrated with an example.

The reasons for defining the ergonomics of the Driver-Machine Interface (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 of the ERTMS/ETCS DMI, only a harmonized approach is feasible;
- defining DMI 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 DMI, 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 50459-1:2021**1 Scope**

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

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

The scope of this document is to define ergonomic principles for the interface between the driver and the above listed applications.

TDD is out of scope of the 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 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 16186-3, *Railway applications - Driver's cab - Part 3: Design of displays*

3 Terms, definitions and abbreviated terms**3.1 Terms and definitions**

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

ISO and IEC maintain databases of terminology 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>

3.1.1**basic screen**

screen that appears in the top-level menu

3.1.2**button**

operating element for interaction with the cab display

EXAMPLE: hard key, soft key, sensitive area

3.1.3**display**

hardware device or system that shows text and/or graphic information to the user

Note 1 to entry: The display optionally contains hard keys.

3.1.4**ERTMS/ETCS system**

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

3.1.5**ERTMS/GSM-R system**

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

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**label**

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

3.1.9**screen**

visual result of software, implemented on a display that the user interacts with

Note 1 to entry: A screen is a set of information made of a background, windows and symbols. This information could be for example speed, distance, pressure, temperature, electric current, real time video images, which can allow or request drivers to input data through a user interface.

3.1.10**sensitive area**

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

3.1.11**soft key**

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

3.1.12**sound group**

set of sounds relating to similar events

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CLC/TS 50459-1:2021**3.1.13****symbol**

presentation of information in graphical form instead of using text

3.1.14**title**

text explaining the purpose of the window or screen

3.1.15**window**

separate visual area of the screen which displays information output and could allow input

3.2 Abbreviated terms

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

| | |
|--------|---|
| CCD | Control and Command Display |
| DMI | Driver-Machine Interface |
| EIRENE | European Integrated Railways radio Enhanced Network |
| ERA | European Union Agency for Railways |
| ERRI | European Rail Research Institute |
| ERTMS | European Rail Traffic Management System |
| ETCS | European Train Control System |
| GSM-R | Global System for Mobile communication – Railways |
| NTC | National Train Control |
| TDD | Technical and Diagnostic Display |
| TRD | Train Radio Display |
| UIC | Union Internationale des Chemins de Fer |

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

This subclause 4.1 provides the requirements for the graphical presentation and arrangement of information shown on the CCD and TRD.

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

The displays shall be located within the maximum reach envelope according to EN 16186-2:2017, Figure A.1.

The displays should be located within the preferred field of vision according to EN 16186-2:2017, Figure A.2.

4.1.2 Presentation techniques**4.1.2.1 Emphasizing particular information**

To emphasize particular information shown on the screen, 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 EN 16186-3.

4.1.2.3 Use of flashing

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

4.1.2.4 Use of frames

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

4.1.2.5 Use of highlighting

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

4.1.2.6 Use of sound

Sound is used to draw attention to the display.

There are five categories of sound relevant to this document:

- 1) feedback sounds;
- 2) ERTMS/ETCS sounds;
- 3) ERTMS/GSM-R sounds;
- 4) NTC sounds; <https://standards.iteh.ai/catalog/standards/sist/7fbcfc3-7d6f-4735-a3bc-18b9417f2c5e/sist-ts-clc-ts-50459-1-2021>
- 5) sounds for other train functions.

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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/TS 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 audible indications shall not conflict with sounds defined in this document or other in-cab indications.

NOTE Additional information can be found in EN 16186-2 and EN 16186-3.

4.1.2.7 Visual indicators

An indicator should be visible for at least 2 s.

NOTE The flashing frame is not subject to this rule.

4.1.3 Text output

Any text displayed on the screen, e.g. words, sentences and questions, shall fulfil the following requirements to provide usability and comprehensibility:

- the terminology should be consistent, i.e. use the same words / terms to describe the same thing;
- the terminology used for the displayed text should be in line with the operational tasks;