SLOVENSKI STANDARD
SIST EN 17230:2021

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Informacijska tehnologija - Uporaba radiofrekvenčne prepoznave (RFID) v železniškem prometu

Information technology - RFID in rail

Informationstechnik - RFID in Eisenbahnanwendungen

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03.220.30	Železniški transport	Transport by rail
35.040.50	Tehnike za samodejno razpoznavanje in zajem podatkov	Automatic identification and data capture techniques
35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

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Information technology - RFID in rail

Technologies de l'information - Identification par radiofréquence dans le secteur ferroviaire

Informationstechnik - RFID in Eisenbahnanwendungen

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 17230:2020) has been prepared by Technical Committee CEN/TC 225 “AIDC Technologies”, the secretariat of which is held by TSE.

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of an identical text or by endorsement, at the latest by May 2021, and conflicting national standards shall be withdrawn at the latest May 2021.

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Introduction

The aim of this document is to describe the implementation of the European Vehicle Number (EVN) of the railway rolling stock in an electronic format via the ISO/IEC 18000-63 UHF Radio Frequency Identification (RFID) technology in order to enable a consistent approach for an interoperable implementation.

Furthermore, the authors of this document recognize that there exists today rolling stock which uses other numbering schemes than the EVN, for example in the Baltic States. Some of these cases are addressed in this document for informative purposes.

1 Scope

The RFID tag location, tag data content and functional requirements have been developed for application on the main line railway networks. Other networks (such as metro) could apply to this document but are outside of its scope.

This document contains:

— description of the RFID tag installation location;

— description of the RFID tag data content;

— description of the functional requirements in relation to the RFID tag track side reading performance.

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 13775-1, *Railway applications - Measuring of new and modified freight wagons - Part 1: Measuring principles*

EN 14067-1:2003, *Railway applications - Aerodynamics - Part 1: Symbols and units*

EN 50125-3:2003, *Railway applications - Environmental conditions for equipment - Part 3: Equipment for signalling and telecommunications*

ETSI EN 302 208, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W*

ISO/IEC 15459 (all parts), *Information technology - Automatic identification and data capture techniques - Unique identification*

ISO/IEC 18000-63, *Information technology - Radio frequency identification for item management - Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

ISO/IEC 19762, *Information technology - Automatic identification and data capture (AIDC) techniques - Harmonized vocabulary*

ISO/IEC 20248, *Information technology - Automatic identification and data capture techniques - Data structures - Digital signature meta structure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762 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 https://www.iso.org/obp

3.1
vehicle
railway vehicle suitable for operation on wheels on railway lines, with or without traction; composed of one or more structural and functional subsystems; carrying its own EVN

3.2
unit
generic term used to name the rolling stock which is subject to the application of this standard, which may be composed of several vehicles

3.3
train
operational formation consisting of one or more units

3.4
fixed formation
train formation that can only be reconfigured within a workshop environment

3.5
trainset
fixed formation that can operate as a train; not intended to be reconfigured, except within a workshop environment; composed of only motored or of motored and non-motored vehicles

3.6
network
lines, stations, terminals, and all kinds of fixed equipment needed to ensure safe and continuous operation of the/a railway system

3.7
keeper
natural or legal person, who, being the owner of a vehicle or having the right to use it, exploits the vehicle as a means of transport and is registered as such in a vehicle register

Note 1 to entry: Keeper is also defined in point (21) of Article 2 of Directive (EU) 2016/797.

3.8
ECM
entity in charge of maintenance

Note 1 to entry: Entity in charge of maintenance is also defined in point (28) of Article 2 of Directive (EU) 2016/797.

3.9
infrastructure manager
rail infrastructure manager

Note 1 to entry: Rail infrastructure manager is also defined in point (44) of Article 2 of Directive (EU) 2016/797.

3.10
railway undertaking
public or private undertaking, the activity of which is to provide transport of goods and/or passengers by rail on the basis that the undertaking is to ensure traction; this also includes undertakings which provide traction only

Note 1 to entry: Railway undertaking is also defined in point (45) of Article 2 of Directive (EU) 2016/797.

3.11
vehicle end
vehicle extremities in longitudinal direction (along the x-axis according to the coordinate system defined in EN 14067-1:2003)

3.12
vehicle side
vehicle's exterior surface in lateral direction (along the y-axis according to the coordinate system defined in EN 14067-1:2003), reaching from one vehicle end to the other and from vehicle bottom to vehicle top

3.13
running gear
wheelsets, bogies and associated suspension components

3.14
articulated vehicle with a shared running gear
system of articulation where each vehicle has its own secondary suspension but shares the running gear with an adjacent vehicle (often referred to as Jacobs bogie)

Note 1 to entry: Typically, each car body is supported at 4 points. Trains made up of vehicles of this type are a particular type of fixed formation train.

3.15
European vehicle number
EVN
unique 12-digit vehicle identification number, which is assigned to each rail vehicle on the European Community Rail Network

Note 1 to entry: The European vehicle number is also defined in Article 46 of Directive (EU) 2016/797.

3.16
8-digit Russian vehicle number
unique 8-digit vehicle identification number, which is assigned to each rail vehicle on the Rail Network of the Commonwealth of Independent States (CIS)

Note 1 to entry The 8-digit Russian vehicle number can be defined according to *[The Permanent Working Group for the Railway Administrative Offices Information Exchange at the Railway Transport IT Specialists Committee and The Directorate for the Railway Transport Council of the Member States of the Commonwealth of Independent States (CIS): S ZhA 8001 16, Minutes of 2016 – Reference Guide 8-Digit Numbering System for 1,520 mm Track Gauge for Passenger Railway Vehicles. 2016]* and *[The Railway Transport IT Specialists Committee: -Minutes No. 32 dated 29th April 2005 – Reference Guide 8-Digit Numbering System for 1,520 mm Track Gauge for Freight Railway Vehicles. 2005]*

4 Symbols and abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
AFI	Application Family Identifier
ASC	Accredited Standards Committee
CSM	Common Safety Method
ECM	Entity in Charge of Maintenance
EMC	Electro Magnetic Compatibility
EPC	Electronic Product Code
EUAR	European Union Agency for Railways
ECVVR	European Centralized Virtual Vehicle Register
EVN	European Vehicle Number
GIAI	Global Individual Asset Identifier
MH10	Material Handling committee 10
NVR	National Vehicle Register
RFID	Radio Frequency Identification
TSI	Technical Specification for Interoperability
UHF	Ultra High Frequency
UII	Unique Item Identifier

5 Concept

The concept is to identify rolling stock automatically based on UHF RFID tags. The main focus of this standard is to clarify applications using fixed track side readers.

Each RFID tag contains a globally unique asset reference encoded according to the Clause 7.

This standard aims to achieve global uniqueness and interoperability.

RFID tag content used in rolling stock identification shall not overlap with any other globally unique identifier coded into RFID tags.

6 RFID tag location

6.1 General

Each vehicle shall be tagged with two UHF RFID tags according to ISO/IEC 18000-63.

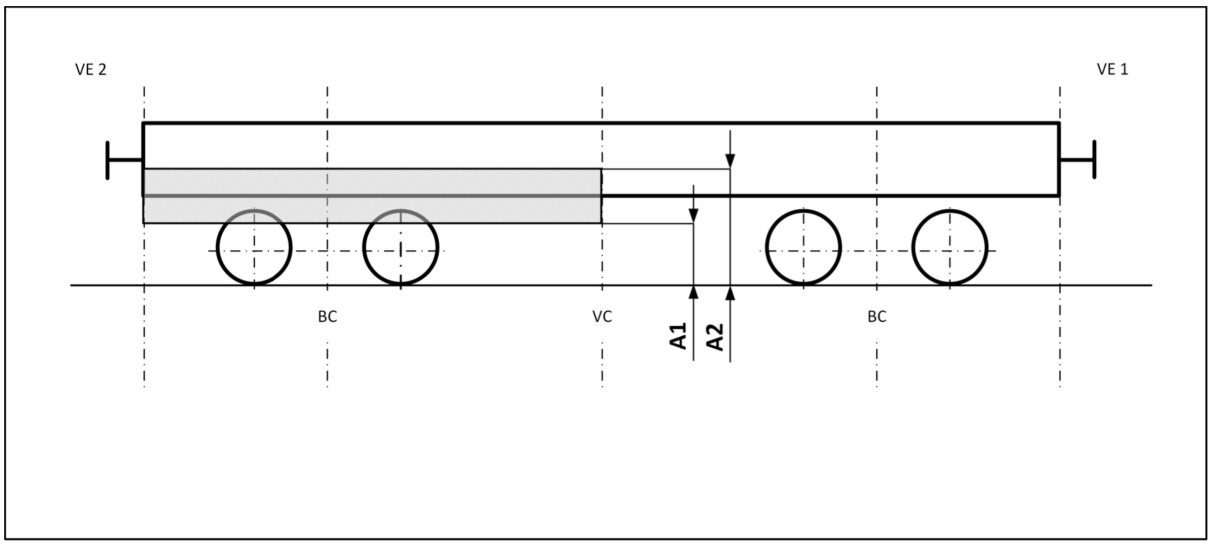
While all other encoded information on the two tags per vehicle is 100 % identical, the content of the two tags differ only by an encoded end/side information. On one tag per vehicle the encoded end/side information is “1”, on the other one the encoded end/side information is “2”. For further details see Clause 7.

The RFID tag location is to be implemented as in the subclauses 6.2 and 6.3. If this is not possible, the implementation should be done into a location closest to the area fulfilling the functional requirements set in this standard.

The physical interactions between the reader and the tag, the protocols and the commands, and the collision arbitration schemes, shall conform to ISO/IEC 18000-63.

Subclause 6.4 explains how to use/relate the end/side information on the tag in order to create a correlation between them and the already existing physical agreed end/side markings of the vehicle.

6.2 Height of the tag in relation to the railhead



Key

A1	allowed minimum height
A2	allowed maximum height
BC	bogie centre axis / bogie pin
VE 1	vehicle end 1
VE 2	vehicle end 2
VC	vehicle centre axis

Figure 1 — Allowed range of vertical tag positions

In Figure 1 above, A1 and A2 are respectively the minimum and maximum height above rail for positioning the centres of the tags in all conditions of wagon loading and suspension movement:

A1 = 500 mm

A2 = 1300 mm for vehicles with maximum speed > 100 km/h, 1800 mm for vehicles with maximum speed < = 100km/h.

When planning reader installations, it is recommended to take in account that there might be existing vehicle implementations outside this range

If the installation is done outside the range A1 - A2, the trackside reading performance as in the paragraph 8.2 Tag performance requirements cannot be guaranteed.

6.3 Horizontal tag location

The horizontal range of allowed tag positions for vehicle ends which **cannot** be leading on the main line, is limited from the left vehicle end to the vehicle centre axis (see area B1 in Figure 2).

Regarding the horizontal range of allowed tag positions for vehicle ends which **can** be leading on the main line, the tag shall be installed in relation to the horizontal axis in the area B2 in Figure 3 respectively Figure 4.

On vehicles without bogies (for example two-axle wagons or two-axle shunting engines (see Annex A)) which have vehicle ends, that can be leading on the main line, the RFID tags at these vehicle ends shall be installed at least 0,6 m behind the first axle towards the centre of the vehicle (see area B2 in Figure 5).