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

Information technology - RFID in rail

Informationstechnik - RFID in Eisenbahnanwendungen

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Information technology - RFID in rail

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European foreword

This document has been prepared by Technical Committee 225 CEN/TC225 “AIDC Technologies”, the secretariat of which is held by TSE.

This document is currently submitted to the CEN Enquiry.

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Introduction

The aim of this standard 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 standard 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 standard for informative purposes.

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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) may apply this standard but are outside of its scope.

This document contains:

- a description of the RFID tag installation location;
- a description of the RFID tag data content;
- a 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 (all parts), *Railway applications - Measuring of new and modified freight wagons*

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

EN ISO/IEC 19762 (all parts), *Information technology - Automatic identification and data capture (AIDC) techniques - Harmonized vocabulary - Part 1: General terms relating to AIDC (ISO/IEC 19762-1)*

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*

ETSI EN 302 208, *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*

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 <http://www.iso.org/obp>

prEN 17230:2018 (E)**3.1****vehicle**

railway vehicle suitable for circulation 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 Union rail system

3.7**keeper**

natural or legal person that, 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: A vehicle register is referred to in Article 47 of the 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 (20) of Article 3 of Directive (EU) 2016/798.

3.9**infrastructure manager**

rail infrastructure manager

Note 1 to entry: infrastructure manager is also defined in point (2) of Article 3 of Directive 2012/34/EU of the European Parliament and of the Council.

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; also including undertakings which provide traction only

Note 1 to entry: Railway undertaking is also defined in point (1) of Article 3 of Directive 2012/34/EU.

3.11**vehicle end**

any longitudinal position between the centre of the vehicle and the end of the vehicle

3.12**vehicle side**

horizontal position between the centre of the vehicle and the side of the vehicle

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 can be defined according to Article 32 of EU Directive 2008/57 EC.

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) according to *[The Permanent Working Group for the Railway Administrative Offices Information Exchange at the Railway Transport IT Specialists Committee & 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 chapter 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 chapter 7.

The RFID tag location is to be implemented as in the chapters 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.

Chapter 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



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 movement¹:

A1 = 500 mm

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

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

Regarding the horizontal range of allowed tag positions for vehicle ends which can be leading on the main line, the tag has to be installed in relation to the horizontal axis in the area B1 in Figure 2.

For vehicles without bogies (for example two axle wagons) which could be the leading vehicle on the mainline, the RFID tag has to be installed at least 0,6 m behind the first axle towards the centre of the vehicle.²

¹ Informative note: When planning reader installations, it is recommended to take in account that there might be existing vehicle implementations outside this range.

² When planning reader installations, please take in account that there might be older vehicle implementations outside this range.