NSAI Standards

Irish Standard
I.S. EN 50238-1:2019

Railway applications - Compatibility between rolling stock and train detection systems - Part 1: General

I.S. EN 50238-1:2019

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN 50238-1:2019 is the adopted Irish version of the European Document EN 50238-1:2019, Railway applications - Compatibility between rolling stock and train detection systems - Part 1: General

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50238-1

October 2019

ICS 29.180; 45.060.10

Supersedes EN 50238-1:2003 and all of its amendments and corrigenda (if any)

English Version

Railway applications - Compatibility between rolling stock and train detection systems - Part 1: General

Applications ferroviaires - Compatibilité entre matériel roulant et systèmes de détection de train - Partie 1 : Généralités

Bahnanwendungen - Kompatibilität zwischen Fahrzeugen und Gleisfreimeldesystemen - Teil 1: Allgemein

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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 CENELEC 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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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Contents

European foreword

This document (EN 50238-1:2019) has been prepared by CLC/SC 9XA “Communication, signalling and processing systems” of CLC/TC 9X “Electrical and electronic applications for railways”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2020-09-09
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2022-09-09

This document supersedes EN 50238-1:2003 and all of its amendments and corrigenda (if any).

EN 50238-1:2019 includes the following significant technical changes with respect to EN 50238-1:2003:

Generic compatibility process to be followed irrespective of whether the trigger is a change to the signalling system, rolling stock or the power system:

1) generic Compatibility Process, which is broken into two stage process depending on whether there are established compatibility limits or not;

2) rules for characterization of train detection systems;

3) rules for characterization of Rolling Stock;

4) rules for characterization of the Power System;

5) references are provided to established CENELEC standards for compatibility;

6) terminology is updated.

Introduction

This document defines a process to demonstrate compatibility between rolling stock operating on an area of use or network and train detection systems installed in this area of use or network.

Currently, general rules for the maximum levels of interference allowed, and maximum susceptibility levels (or minimum required immunity levels) are not established in every country. This is due to the great diversity of rolling stock, power supply and return current systems, and train detection systems installed in Europe. This diversity leads to consideration of compatibility of rolling stock and train detection systems on a ‘route by route’ or “network by network” basis, to avoid unnecessarily restrictive specifications.

The compatibility process described in this document is generic. The process refers to all types of Train Detection Systems (TDS), which may be influenced by electromagnetic emissions of rolling stock or traction power supply systems, (e.g. axle counters, track circuits, wheel detectors, loops).

Compatibility is determined by both physical and electromagnetic considerations. With regard to the Electro Magnetic Compatibility, the need is not for general values for maximum levels of interference permitted, and maximum susceptibility levels (or minimum required immunity levels) but for convenient methods by which to specify the level of interference allowed for operation on routes or a network.

Main interference sources are considered to be:

— rail currents and voltage sources;

— electromagnetic fields;

— differential voltage between adjacent axles of the train;

as shown in Figure 1.

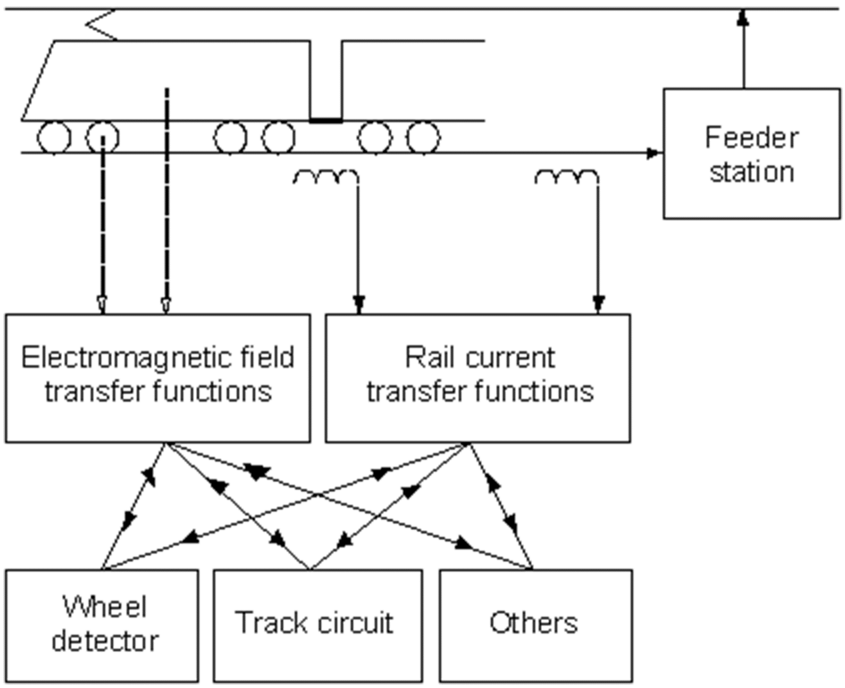

Figure 1 — Sources of electromagnetic interference

In practice, the susceptibility of the system is determined by:

— the sensitivity of individual components of the system and the type of interference it is susceptible to;

— the application of the components, i.e. the configuration of the system.

Therefore the problems concerning TDS are considered separately for each type.

- CLC/TS 50238-2 or national rules define compatibility limits for track circuits;
- CLC/TS 50238-3 or national rules define compatibility limits for axle counters and wheel detectors;
- EN 50592 defines the testing method of rolling stock for electromagnetic compatibility with axle counters;
- Compatibility with other types of wheel detectors (mechanical or magnetic) is described in 5.4;
- Compatibility with loops can be established following the guidance in 5.5;
- Compatibility with any other type of TDS not explicitely covered by this document can also be established following the generic process in this document.

For determining the susceptibility of signalling systems, laboratory/simulation testing methods and *in situ* tests on the “real railway” are proposed. Modelling enables worst-case conditions to be simulated. In addition, particular test sites are selected because, from experience, they are expected to provide the test evidence required.

Then, taking account of the experience of the railways, it is possible to establish a general method for determining the susceptibility of train detection systems, described in this document. General requirements how to establish immunity have been defined in EN 50617-1 and EN 50617-2.

Before assessing the electromagnetic emissions of rolling stock, sufficient knowledge of the electric circuit diagram of the power equipment is necessary, including switching frequencies of on-board power converters, type of regulation used for power converters, resonant frequency of each filter, operating limits under high and low supply voltages, degraded modes of operation, etc. EN 50592 defines the testing method of rolling stock for electromagnetic compatibility with axle counters.

1 Scope

This document describes a process to demonstrate compatibility between Rolling Stock (RST) and Train Detection Systems (TDS). It describes the characterization of train detection systems, rolling stock and traction power supply systems.

It is worth noting that the demonstration of technical compatibility between the rolling stock and infrastructure with respect to physical dimensions is not detailed in this document.

This document is not generally applicable to those combinations of rolling stock, traction power supply and train detection system which were accepted as compatible prior to the issue of this document. However, as far as is reasonably practicable, this document can be applied to modifications of rolling stock, traction power supply or train detection systems which may affect compatibility. The detailed process can be used where no rules and processes for compatibility are established.

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 50617-1, *Railway applications – Technical parameters of train detection systems for the interoperability of the trans-European railway system – Part 1: Track circuits*

EN 50617-2, *Railway Applications – Technical parameters of train detection systems for the interoperability of the trans-European railway system –- Part 2: Axle counters*

EN 50592, *Railway applications – Testing of rolling stock for electromagnetic compatibility with axle counters*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
competent body
body responsible for the independent evaluation of the compatibility case

Note 1 to entry: This can be an accredited conformity body or an Independent Safety Assessor. This role is not limited to external parties, unless mandated under the applicable legislation.

3.1.2
compatibility case
set of documents which records the evidence demonstrating the compatibility between rolling stock, traction power supplies and train detection systems for a specific route or specific railway network

[SOURCE: IEC 60050-821:2017, 821-03-47]