

Railway applications — Electromagnetic compatibility —

Part 3-1: Rolling stock — Train and complete vehicle

ICS 33.100.01; 29.280; 45.060.01

National foreword

This British Standard is the UK implementation of EN 50121-3-1:2006, incorporating corrigendum May 2008. It supersedes BS EN 50121-3-1:2000 which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by CENELEC corrigendum May 2008 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee GEL/9, Railway electrotechnical applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 September 2006

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ISBN 978 0 580 63365 2

Amendments/corrigenda issued since publication

Date	Comments
31 October 2008	Implementation of CENELEC corrigendum May 2008

**Railway applications -
Electromagnetic compatibility
Part 3-1: Rolling stock -
Train and complete vehicle**

Applications ferroviaires -
Compatibilité électromagnétique
Partie 3-1: Matériel roulant -
Trains et véhicules complets

Bahnanwendungen -
Elektromagnetische Verträglichkeit
Teil 3-1: Bahnfahrzeuge -
Zug und gesamtes Fahrzeug

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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 Central Secretariat has the same status as the official versions.

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CENELEC

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

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Foreword

This European Standard was prepared by Technical Committee TC 9X: Electrical and electronic applications for railways. The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50121-3-1 on 2006-07-01.

This European Standard supersedes EN 50121-3-1:2000.

This European Standard is to be read in conjunction with EN 50121-1.

This standard forms Part 3-1 of the European Standard series EN 50121, published under the general title "Railway applications - Electromagnetic compatibility". The series consists of:

- Part 1 : General
- Part 2 : Emission of the whole railway system to the outside world
- Part 3-1 : Rolling stock - Train and complete vehicle
- Part 3-2 : Rolling stock - Apparatus
- Part 4 : Emission and immunity of the signalling and telecommunications apparatus
- Part 5 : Emission and immunity of fixed power supply installations and apparatus

The following dates were fixed:

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|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2007-07-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2009-07-01 |

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive [\[AC1\]](#) 2004/108/EC [\[AC1\]](#). See Annex ZZ.

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Introduction

High powered electronic equipment, together with low power microcontrollers and other electronic devices, is being installed on trains in great numbers. Electromagnetic compatibility has therefore become a critical issue for the design of train related apparatus as well as of the train as a whole.

This Product Standard for rolling stock sets limits for electromagnetic emission and immunity in order to ensure a well functioning system within its intended environment.

Immunity limits are not given for the complete vehicle. Part 3-2 of this standard defines requirements for the apparatus installed in the rolling stock, since it is impractical to test the complete unit. An EMC plan shall be established for equipment covered by this standard.

1 Scope

This European Standard specifies the emission and immunity requirements for all types of rolling stock. It covers traction stock and trainsets including urban vehicles for use in city streets.

The frequency range considered is from d.c. to 400 GHz. No measurements need to be performed at frequencies where no requirement is specified.

The scope of this part of the standard ends at the interface of the rolling stock with its respective energy inputs and outputs. In the case of locomotives, trainsets, trams etc., this is the current collector (pantograph, shoe gear). In the case of hauled stock, this is the a.c. or d.c. auxiliary power connector. However, since the current collector is part of the traction stock, it is not entirely possible to exclude the effects of this interface with the power supply line. The slow moving test has been designed to minimise these effects.

Basically, all apparatus to be integrated into a vehicle shall meet the requirements of Part 3-2 of this standard. In exceptional cases, where apparatus meets another EMC Standard, but full compliance with Part 3-2 is not demonstrated, EMC shall be assured by adequate integration measures of the apparatus into the vehicle system and/or by an appropriate EMC analysis and test which justifies deviating from Part 3-2.

The electromagnetic interference concerning the railway system as a whole is dealt with in EN 50121-2.

These specific provisions are to be used in conjunction with the general provisions in EN 50121-1.

2 Normative references

The following referenced documents are indispensable for the application 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 50121-1	Railway applications - Electromagnetic compatibility Part 1: General
EN 50121-2	Railway applications - Electromagnetic compatibility Part 2: Emission of the whole railway system to the outside world
EN 50121-3-2	Railway applications - Electromagnetic compatibility Part 3-2: Rolling stock - Apparatus
EN 50238	Railway applications - Compatibility between rolling stock and train detection systems
EN 55016-1-1	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus (CISPR 16-1-1)
ITU-T	Directive concerning the protection of telecommunication lines against harmful effects from electrical power and electrified railway lines Volume VI: Danger and disturbances