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Edition 1.0 2016-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Electromagnetic compatibility (EMC) – Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena

Compatibilité électromagnétique (CEM) – Partie 1-2: Généralités – Méthodologie pour la réalisation de la sécurité fonctionnelle des systèmes électriques et électroniques, y compris les équipements, du point de vue des phénomènes électromagnétiques

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena

FOREWORD

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International Standard IEC 61000-1-2 has been prepared by technical committee 77: Electromagnetic compatibility.

It has the status of a basic safety publication in accordance with IEC Guide 104.

This first edition cancels and replaces the second edition of IEC TS 61000-1-2 published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- Alignment with the changes done in the latest edition of the functional safety standard IEC 61508.

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- Complete review with regard to transforming this document into an International Standard (instead of the previous edition as Technical Specification).
- New structure of Annex B.

The text of this standard is based on the following documents:

FDIS	Report on voting
77/513/FDIS	77/519/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61000 series, published under the general title *Electromagnetic compatibility (EMC)*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

IEC 61000 is published in separate parts according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)

Definitions, terminology

Part 2: Environment

Description of the environment

Classification of the environment

Compatibility levels

Part 3: Limits

Emission limits

Immunity limits (insofar as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques

Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines

Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as international standards, technical specifications or technical reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and completed by a second number identifying the subdivision (example: IEC 61000-3-11).

Particular considerations for IEC 61000-1-2

The aim of this international standard with regard to EMC and functional safety is to address the possible effects of electromagnetic disturbances on safety-related systems and to specify requirements for the relevant phases of the lifecycle of a safety-related system. The objective is to achieve the systematic capability as specified in the electrical/electronic/programmable electronic system safety requirements specification with regard to electromagnetic aspects.

This document makes use of existing relevant basic IEC standards, as far as appropriate. It considers the work of SC 65A relating to functional safety concepts of the IEC 61508 series and of TC 77 and its subcommittees relating to the electromagnetic environments. More details can be found in the publications of these committees.

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena

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1 Scope

This part of IEC 61000 establishes a methodology for the achievement of functional safety only with regard to electromagnetic phenomena. This methodology includes the implication it has on equipment used in such systems and installations.

This standard:

a) applies to safety-related systems and installations incorporating electrical/electronic/programmable electronic equipment as installed and used under operational conditions;

b) considers the influence of the electromagnetic environment on safety-related systems;

c) is not concerned with direct hazards from electromagnetic fields on living beings nor is it concerned with safety related to breakdown of insulation or other mechanisms by which persons can be exposed to electrical hazards.

It mainly covers EMC related aspects of the design and application specific phases of safety-related systems and equipment used therein, and deals in particular with

- some basic concepts in the area of functional safety,
- the various EMC specific steps for the achievement and management of functional safety,
- the description and assessment of the electromagnetic environment,
- the EMC aspects of the design and integration process, taking into account the process of EMC safety planning on system as well as on equipment level,
- the validation and verification processes regarding the immunity against electromagnetic disturbances,
- the performance criterion and some test philosophy considerations for safety-related systems and the equipment used therein,
- aspects related to testing of the immunity of safety-related systems and equipment used therein against electromagnetic disturbances.

This International Standard is applicable to electrical/electronic/programmable electronic (E/E/PE) safety-related systems intended to comply with the requirements of IEC 61508 and/or associated sector-specific functional safety standards. It is intended for designers, manufacturers, installers and users of safety-related systems and can be used as a guide by IEC committees.

For safety-related systems covered by other functional safety standards, the requirements of this standard should be considered in order to identify the appropriate measures that should be taken with relation to EMC and functional safety.

NOTE This standard can also be used as a guide for considering EMC requirements for other systems having a direct contribution to safety.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-161, *International Electrotechnical Vocabulary (IEV) – Part 161: Electromagnetic compatibility*

IEC TR 61000-1-6, *Electromagnetic compatibility (EMC) – Part 1-6: General – Guide to the assessment of measurement uncertainty*

IEC TR 61000-2-5, *Electromagnetic compatibility (EMC) – Part 2-5: Environment – Description and classification of electromagnetic environments*

IEC 61000-4-X (all parts), *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques*

IEC 61000-4-1, *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series*

IEC 61000-6-7, *Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161 as well as the following apply.

3.1.1
degradation (of performance)
undesired departure in the operational performance of any device, equipment or system from its intended performance

Note 1 to entry: The term "degradation" can apply to temporary or permanent failure.

[SOURCE: IEC 60050-161:1990, 161-01-19]

3.1.2
electrical/electronic/programmable electronic
E/E/PE
based on electrical and/or electronic and/or programmable electronic technology

Note 1 to entry: The term is intended to cover any and all devices or systems operating on electrical principles.

EXAMPLE Electrical/electronic/programmable electronic devices include

– electro-mechanical devices (electrical);
– solid-state non-programmable electronic devices (electronic);
– electronic devices based on computer technology (programmable electronic).

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