
Irish Standard
I.S. EN 60300-3-15:2009

# Dependability management -- Part 3 -15: Application guide - Engineering of system dependability (IEC 60300-3 -15:2009 (EQV))

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# EN 60300-3-15

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English version

# Dependability management - Part 3-15: Application guide - Engineering of system dependability

(IEC 60300-3-15:2009)

Gestion de la sûreté de fonctionnement - Partie 3-15: Guide d'application - Ingénierie de la sûreté de fonctionnement des systèmes
(CEI 60300-3-15:2009)

Zuverlässigkeitsmanagement - Teil 3-15: Anwendungsleitfaden - Technische Realisierung der Systemzuverlässigkeit
(IEC 60300-3-15:2009)

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CENELEC

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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**



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## Foreword

The text of document 56/1315/FDIS, future edition 1 of IEC 60300-3-15, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60300-3-15 on 2009-10-01

The following dates were fixed:

| | | |
|---|---|---|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2010-07-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-10-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60300-3-15:2009 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---|---|---|
| [1] IEC 61069-1 | NOTE | Harmonized as EN 61069-1:1993 (not modified). |
| [2] IEC 62347 | NOTE | Harmonized as EN 62347:2007 (not modified). |
| [7] IEC 60300-3-1 | NOTE | Harmonized as EN 60300-3-1:2004 (not modified). |
| [9] IEC 61508 | NOTE | Harmonized in EN 61508 series (not modified). |
| [10] IEC 61508-1 | NOTE | Harmonized as EN 61508-1:2001 (not modified). |
| [12] IEC 61014 | NOTE | Harmonized as EN 61014:2003 (not modified). |
| [13] IEC 61164 | NOTE | Harmonized as EN 61164:2004 (not modified). |
| [14] ISO 10007 | NOTE | Harmonized as EN ISO 10007:1996 (not modified). |
| [16] IEC 60300-3-11 | NOTE | Harmonized as EN 60300-3-11:2009 (not modified). |
| [17] IEC 60300-3-12 | NOTE | Harmonized as EN 60300-3-12:2004 (not modified). |
| [22] IEC 60721 | NOTE | Harmonized in EN 60721 series (not modified). |
| IEC 60300-3-4 | NOTE | Harmonized as EN 60300-3-4:2008 (not modified). |
| IEC 60812 | NOTE | Harmonized as EN 60812:2006 (not modified). |
| IEC 61025 | NOTE | Harmonized as EN 61025:2007 (not modified). |
| IEC 61078 | NOTE | Harmonized as EN 61078:2006 (not modified). |
| IEC 61508-7 | NOTE | Harmonized as EN 61508-7:2001 (not modified). |
| IEC 61709 | NOTE | Harmonized as EN 61709:1998 (not modified). |
| IEC 62308 | NOTE | Harmonized as EN 62308:2006 (not modified). |
| ISO 13407 | NOTE | Harmonized as EN ISO 13407:1999 (not modified). |

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# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60300-1 | -[1)] | Dependability management - Part 1: Dependability management systems | EN 60300-1 | 2003[2)] |
| IEC 60300-2 | -[1)] | Dependability management - Part 2: Guidelines for dependability management | EN 60300-2 | 2004[2)] |

[1)] Undated reference.

[2)] Valid edition at date of issue.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# DEPENDABILITY MANAGEMENT –

# Part 3-15: Application guide – Engineering of system dependability

## FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60300-3-15 has been prepared by IEC technical committee 56: Dependability.

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

| FDIS | Report on voting |
|---|---|
| 56/1315/FDIS | 56/1321/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 of the IEC 60300 series, under the general title *Dependability management*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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
- amended.

# INTRODUCTION

Systems are growing in complexity in today's application environments. System dependability has become an important performance attribute that affects the business strategies in system acquisition and the cost-effectiveness in system ownership and operations. The overall dependability of a system is the combined result of complex interactions of system elements, application environments, human-machine interfaces, deployment of support services and other influencing factors.

This part of IEC 60300 gives guidance on the engineering of the overall system to achieve its dependability objectives. The engineering approach in this standard represents the application of appropriate scientific knowledge and relevant technical disciplines for realizing the required dependability for the system of interest.

The four main aspects for engineering dependability concerning systems are addressed in terms of

– process,
– achievement,
– assessment, and
– measurement.

The engineering disciplines consist of technical processes that are applicable to the various stages of the system life cycle. Specific technical processes described in this part of IEC 60300 are supported by a sequence of relevant process activities to achieve the objectives of each system life cycle stage.

This part of IEC 60300 is applicable to generic systems with interacting system functions consisting of hardware, software and human elements to achieve system performance objectives. In many cases a function can be realized by commercial off-the-shelf products. A system can link to other systems to form a network. The boundaries separating a product from a system, and a system from a network, can be distinguished by defining the application of the entity. For example, a digital timer as a product can be used to synchronize the operation of a computer; the computer as a system can be linked with other computers in a business office for communications as a local area network. The application environment is applicable to all kinds of systems. Examples of applicable systems include control systems for power generation, fault-tolerant computing systems and systems for provision of maintenance support services.

Guidance on dependability engineering is provided for generic systems. It does not classify systems for special applications. The majority of systems in use are generally repairable throughout their life cycle operation for economic reasons and practical applications. Non-repairable systems such as communication satellites, remote sensing/monitoring equipment, and one-shot devices are considered as application-specific systems. They require further identification of specific application environment, operational conditions and additional information on unique performance characteristics to achieve their mission success objectives. Non-repairable subsystems and components are considered as throwaway items. The selection of applicable processes for engineering dependability into a specific system is carried out through the project tailoring and dependability management process.

This part of IEC 60300 forms part of the framework standards on system aspects of dependability to support IEC 60300-1 and IEC 60300-2 on dependability management. References are made to project management activities applicable to systems. They include identification of dependability elements and tasks relevant to the system and guidelines for dependability management reviews and tailoring of dependability projects.

# DEPENDABILITY MANAGEMENT –

# Part 3-15: Application guide – Engineering of system dependability

## 1 Scope

This part of IEC 60300 provides guidance for an engineering system's dependability and describes a process for realization of system dependability through the system life cycle.

This standard is applicable to new system development and for enhancement of existing systems involving interactions of system functions consisting of hardware, software and human elements.

This standard also applies to providers of subsystems and suppliers of products that seek system information and criteria for system integration. Methods and tools are provided for system dependability assessment and verification of results for achievement of dependability objectives.

## 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.

IEC 60300-1, *Dependability management – Part 1: Dependability management systems*

IEC 60300-2, *Dependability management – Part 2: Guidelines for dependability management*

## 3 Terms and definitions

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

**3.1**
**system**
set of interrelated items considered as a whole for a defined purpose, separated from other items

NOTE 1 A system is generally defined with the view of performing a definite function.

NOTE 2 The system is considered to be bound by an imaginary surface that intersects the links between the system and the environment and the other external systems.

NOTE 3 External resources (i.e. outside the system boundary) may be required for the system to operate.

NOTE 4 A system structure may be hierarchical, e.g. system, subsystem, component, etc.

**3.2**
**subsystem**
system that is part of a more complex system

**3.3**
**operating profile**
complete set of tasks to achieve a specific system objective