

# INTERNATIONAL STANDARD

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**60300-1**

Second edition  
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## **Dependability management –**

### **Part 1: Dependability management systems**

*Gestion de la sûreté de fonctionnement –*

*Partie 1:*

*Gestion du programme de sûreté de fonctionnement*

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DEPENDABILITY MANAGEMENT –****Part 1: Dependability management systems**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 60300-1 has been prepared by IEC technical committee 56: Dependability.

This second edition cancels and replaces the first edition, published in 1993, and constitutes a technical revision.

The main changes with respect to the previous edition are listed below.

- Dependability management system seen as part of the organization's overall management system.
- Structural and terminological alignment with ISO 9000:2000 standards.
- Focus on systems.

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

FDIS	Report on voting
56/856/FDIS	56/861/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.

The committee has decided that the contents of this publication will remain unchanged until 2010. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

Withdrawn

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## INTRODUCTION

Dependability is a key decision factor in today's global business environment. Dependability affects product costs and processes. It is an inherent product design property influencing product performance. A dependable product is achieved through the implementation of dependability disciplines in the early concept and design phases of the product life cycle to provide cost-effective product operations. Like other technical and engineering disciplines, dependability needs to be managed in order to deliver high-value products to customers. In the broadest sense, dependability reflects user confidence in fitness for use by attaining satisfaction in product performance capability, delivering service availability upon demand, and minimizing the costs associated with the acquisition and ownership throughout the life cycle.

Dependability is the collective term describing the availability performance of any simple to complex product. The factors influencing the availability performance of a product are the reliability and maintainability design characteristics and the maintenance support performance. Annex A provides the dependability relationships. In many products, reliability, maintainability, and availability rank amongst the dominant performance characteristics of importance to the customers seeking cost-effective operation. Reliability and maintainability are performance characteristics inherent in the product design. Maintenance support is external to the product, and will affect its dependability. Maintenance support performance reflects the ability of the maintenance organization to provide the necessary resources to sustain a level of maintenance support effort to achieve system availability performance objectives.

This part of IEC 60300 provides general guidelines in establishing a dependability management system to meet most organization or project needs. The structure of the referenced dependability standards follows a "tool-box" concept. The recommendations are non-prescriptive to facilitate tailoring and effective implementation of dependability disciplines in management. The top-level dependability management standard IEC 60300-1 is supported by IEC 60300-2 providing references to application guidelines and methods. This "tool-box" concept helps standards users locate specific dependability application guidelines and relevant methods to accomplish their respective project objectives.

This standard encourages innovation and flexibility in management and design for product optimization with known constraints and technology limitations. It is aligned with ISO 9001:2000 and ISO 9004:2000 Quality Management Systems (QMS) structure to facilitate incorporation of dependability activities in the overall management system. Dependability activities complement QMS processes to achieve the desired levels of reliability, maintainability, and maintenance support performance of products. The alignment of IEC 60300-1 to ISO 9001:2000 and ISO 9004:2000 is necessary to link specific dependability recommendations to relevant QMS processes. The major clauses in IEC 60300-1 are cross-referencing ISO 9001:2000 and ISO 9004:2000 although some clause headings may not be exactly the same. They address similar quality topics from a dependability perspective.

# DEPENDABILITY MANAGEMENT –

## Part 1: Dependability management systems

### 1 Scope and object

This part of IEC 60300 describes the concepts and principles of dependability management systems. It identifies the generic processes in dependability for planning, resource allocation, control, and tailoring necessary to meet dependability objectives.

This standard deals with the dependability performance issues in the product life-cycle phases concerning planning, design, measurements, analysis and improvement. Dependability includes availability performance and its influencing factors: reliability performance, maintainability performance, and maintenance support performance.

The object of this standard is to facilitate co-operation by all parties concerned (supplier, organization and customer) and foster understanding of the dependability needs and value to achieve the overall 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 60300-2, *Dependability management – Part 2: Guidelines for dependability programme management*<sup>1</sup>

ISO 9000:2000, *Quality management systems – Fundamentals and vocabulary*

ISO 9001:2000, *Quality management systems – Requirements*

ISO 9004:2000, *Quality management systems – Guidelines for performance improvements*

### 3 Terms and definitions

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

NOTE Certain terms come from IEC 60050(191) and, where this is the case, the concept from that publication is referenced in square brackets after the definition. ISO 9000:2000 is used as referenced to quality vocabulary.

#### 3.1 dependability

collective term used to describe the availability performance and its influencing factors: reliability performance, maintainability performance and maintenance support performance

NOTE Dependability is used only for general descriptions in non-quantitative terms.

[IEC 60050, 191-02-03]

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<sup>1</sup> Second edition to be published.



### 3.2 dependability management

coordinated activities to direct and control an organization with regard to dependability

NOTE Dependability management is part of an organization's overall management.

### 3.3 dependability management system

management system to direct and control an organization with regard to dependability

NOTE 1 The dependability management system of an organization is part of its overall management system.

NOTE 2 The organizational structure, responsibilities, procedures, processes and resources used for managing dependability are often referred to as dependability programme.

### 3.4 dependability plan

document setting out the specific dependability practices, resources and sequences of activities relevant to a particular product, contract or project

### 3.5 product result of a process

NOTE 1 There are four generic product categories, as follows:

- services (for example, transport);
- software (for example, computer program, dictionary);
- hardware (for example, engine mechanical part);
- processed materials (for example, lubricant).

Many products comprise elements belonging to different generic product categories. Whether the product is then called service, software, hardware or processed material depends on the dominant element. For example the offered product "automobile" consists of hardware (for example, tyres), processed materials (for example, fuel, cooling liquid), software (for example, engine control software, driver's manual), and service (for example, operating explanations given by the salesman).

NOTE 2 Service is the result of at least one activity necessarily performed at the interface between the supplier and customer and is generally intangible. Provision of a service can involve, for example, the following:

- an activity performed on a customer-supplied tangible product (for example, automobile to be repaired);
- an activity performed on a customer-supplied intangible product (for example, the income statement needed to prepare a tax return);
- the delivery of an intangible product (for example, the delivery of information in the context of knowledge transmission);
- the creation of ambience for the customer (for example, in hotels and restaurants).

Software consists of information and is generally intangible and can be in the form of approaches, transactions or procedures.

Hardware is generally tangible and its amount is a countable characteristic. Processed materials are generally tangible and their amount is a continuous characteristic. Hardware and processed materials often are referred to as goods.

NOTE 3 Quality assurance is mainly focused on intended product.

[ISO 9000, 3.4.2]

NOTE 4 In the context of dependability, a product may be simple (for example, a device, a software algorithm) or complex (for example, a transportation system or an integrated network comprising of hardware, software and human elements and support facilities and activities).

### 3.6 system set of interrelated or interacting elements

[ISO 9000, 3.2.1]

NOTE 1 In the context of dependability, a system will have

- a defined purpose expressed in terms of intended functions;
- stated conditions of operation/use (191-01-12);
- defined boundaries.

NOTE 2 The structure of a system may be hierarchical.

## 4 Dependability management system

### 4.1 Application

This standard is applicable for organizations wishing to establish and maintain a dependability management system. It provides generic guidance for effective dependability management of products, which may consist of a combination of hardware, software, and human interactions and support activities. The objective is to ensure achievement of the dependability of the product under consideration by addressing the essential dependability management processes. These processes are generic and applicable to all organizations, life-cycle phases, and contract situations, regardless of type, size and product provided.

It is recognized that, in certain circumstances, it may be inappropriate to include all the clauses of this standard within a project or a contract. Accordingly, this standard should only be considered as forming part of a contract – however that contract may be formed – if the parties to that contract explicitly call upon and refer to this standard (or parts thereof) and require it to be included within the contract.

This standard describes the fundamentals of dependability management systems and provides general principles for organizations aiming to

- a) establish a dependability management system to achieve product dependability objectives;
- b) determine the customer's dependability needs and expectations and how to meet them;
- c) assist in the development of dependability plans;
- d) measure and improve the effectiveness of the dependability management system;
- e) facilitate communications on dependability activities.

### 4.2 General recommendations

The organization should establish and maintain a dependability management system to direct and control the dependability activities. The dependability management system of an organization should be an integral part of its overall management system. Annex B provides generic process steps for managing dependability.

The organization should

- a) identify the dependability activities related to the needs of the organization's business;
- b) establish dependability objectives and plan product life-cycle phases as appropriate to specific projects;
- c) ensure timely implementation of relevant time-phased dependability activities during all applicable project phases;
- d) determine criteria and methods for dependability assessment, evaluation and acceptance of the product;
- e) provide available resources and information necessary to support product realization by implementation of relevant dependability activities in projects;
- f) monitor the dependability activities, and measure and analyse the results for continual improvement;
- g) encourage collaboration of process applications (design, product realization, service provision, etc.) to maintain cost-effective operations;
- h) promote supplier-organization-customer relationships to achieve overall project objectives and customer satisfaction.