



SLOVENSKI STANDARD

SIST EN 60706-3:2007

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Vzdrževalnost opreme - 3. del: Overjanje, zbiranje, analiza in predstavitev podatkov (IEC 60706-3:2006)

Maintainability of equipment -- Part 3: Verification and collection, analysis and presentation of data

Instandhaltbarkeit von Geräten -- Teil 3: Verifizierung und Erfassung, Analyse und Darstellung von Daten

Maintenabilité de matériel -- Partie 3: Vérification et recueil, analyse et présentation de données

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Ta slovenski standard je istoveten z: EN 60706-3:2006

ICS:

03.100.40	Raziskave in razvoj	Research and development
21.020	Značilnosti in načrtovanje strojev, aparatov, opreme	Characteristics and design of machines, apparatus, equipment

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EUROPEAN STANDARD
NORME EUROPÉENNE
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English version

Maintainability of equipment
Part 3: Verification and collection, analysis and
presentation of data
(IEC 60706-3:2006)

Maintenabilité de matériel
Partie 3: Vérification et recueil,
analyse et présentation de données
(CEI 60706-3:2006)

Instandhaltbarkeit von Geräten
Teil 3: Verifizierung und Erfassung,
Analyse und Darstellung von Daten
(IEC 60706-3:2006)

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This European Standard was approved by CENELEC on 2006-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 56/1094/FDIS, future edition 2 of IEC 60706-3, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60706-3 on 2006-07-01.

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) 2007-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60706-3:2006 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:

IEC 60300-1	NOTE Harmonized as EN 60300-1:2003 (not modified).
IEC 60300-2	NOTE Harmonized as EN 60300-2:2004 (not modified).
IEC 60300-3	NOTE Harmonized as EN 60300-3 (series) (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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-191	1990	International Electrotechnical Vocabulary (IEV) Chapter 191: Dependability and quality of service	-	-
IEC 60300-3-5	- ¹⁾	Dependability management Part 3-5: Application guide - Reliability test conditions and statistical test principles	-	-
IEC 60300-3-10	2001	Dependability management Part 3-10: Application guide - Maintainability	-	-
IEC 60300-3-12	- ¹⁾	Dependability management Part 3-12: Application guide - Integrated logistic support	EN 60300-3-12	2004 ²⁾
IEC 60300-3-14	- ¹⁾	Dependability management Part 3-14: Application guide - Maintenance and maintenance support	EN 60300-3-14	2004 ²⁾
IEC 60706-2	- ¹⁾	Maintainability of equipment Part 2: Maintainability requirements and studies during the design and development phase	EN 60706-2	2006 ²⁾
IEC 61160	- ¹⁾	Design review	EN 61160	2005 ²⁾
IEC 61649	- ¹⁾	Goodness-of-fit tests, confidence intervals and lower confidence limits for Weibull distributed data	-	-
IEC 61710	- ¹⁾	Power law model - Goodness-of-fit tests and estimation methods	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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NORME
INTERNATIONALE
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CEI
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60706-3

Deuxième édition
Second edition
2006-04

Maintenabilité de matériel –

**Partie 3:
Vérification et recueil, analyse
et présentation de données**

iTeh STANDARD PREVIEW

(Maintainability of equipment –

Part 3: [SIST EN 60706-3:2007](https://standards.iteh.ai/catalog/standards/sist/d48c0189-e548-4cf7-ac01-453528d2f2c6/sist-en-60706-3-2007)

**Verification and collection, analysis
and presentation of data**

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MAINTAINABILITY OF EQUIPMENT –

**Part 3: Verification and collection, analysis
and presentation of data**

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 60706-3 has been prepared by IEC technical committee 56: Dependability.

This second edition cancels and replaces the first edition, published in 1983, and constitutes a technical revision.

The major technical changes with regard to the first edition concern combining the original Sections 6 and 7 from the first edition and adding the two statistical annexes from IEC 60706-6, which have been included as Annexes B and C.

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

FDIS	Report on voting
56/1094/FDIS	56/1109/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.

IEC 60706 consists of the following parts¹, under the general title *Maintainability of equipment*:

NOTE Each part outlines the application of specific techniques to implement a maintainability programme.

- Part 1: Introduction, requirements and maintenance programme
- Part 2: Maintainability studies during the design phase
- Part 3: Verification and collection, analysis and presentation of data
- Part 4: Guide to maintenance and maintenance support planning
- Part 5: Diagnostic testing
- Part 6: Statistical methods in maintainability evaluation

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; <https://standards.iteh.ai/catalog/standards/sist/d48c0c89-e548-4cf7-ac01-4528d2f2c6/sist-en-60706-3-2007>
- replaced by a revised edition, or
- amended.

¹ Parts 1, 4 and 6 are currently being absorbed into other parts of IEC 60706. The Foreword of the relevant part will give an explanatory text.

INTRODUCTION

The design of an item includes the need for efficient maintenance techniques to ensure that the item continues to operate properly. Before it is put into service it is necessary to verify that the proposed maintenance procedures can be executed as designed and the collection and analysis of data is an essential part of the verification process.

The data used for verification may come from a variety of sources and what is used in particular circumstances will depend on many factors, including what historical data are available and the status of the design. For verification that maintainability targets have been met, it is preferable to conduct tests that generate data on the product under review. Historical data have to be sorted for relevance to the project and when useful data have been selected, they are analysed to provide the information required.

There are a number of verification procedures that are explained in this standard with the associated analysis techniques. They are designed to check the adequacy of the maintenance procedures, the tools and equipment supplied for maintenance, the adequacy of the technical publications and the ease of maintenance of the item. This enables improvements to be made to the maintenance procedures and, if necessary, modifications to be carried out on the item to improve maintainability. It is important to include any required changes to the design of the item as early as possible, if possible before the start of production, in order to minimize costs.

This initial analysis is, in most cases, a statistical analysis based on a small sample of data. It is therefore preferable that the collection and analysis of data should go on after the item enters service so that the results achieved by the verification process are refined and improved. These data are important to determine the adequacy of the maintenance support, as this is not so easy to assess in an initial verification analysis.

IEC 60706-3 forms part of a hierarchy of standards dealing with dependability, as described below.

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IEC 60300-1 and IEC 60300-2 are the IEC top-level standards that provide guidance on how to incorporate dependability, incorporating reliability, availability and maintainability, into manufactured products. The top-level standard on maintainability is the application guide for maintainability, IEC 60300-3-10, which forms part of the IEC 60300-3 series of standards. It can be used to implement a maintainability programme covering the initiation, development and in-service phases of a product, which form part of the tasks described in IEC 60300-2. It also provides guidance on how the maintenance aspects of the tasks should be considered in order to achieve optimum maintainability.

MAINTAINABILITY OF EQUIPMENT –

Part 3: Verification and collection, analysis and presentation of data

1 Scope

This part of IEC 60706 describes the various aspects of verification necessary to ensure that the specified maintainability requirements of an item have been met and provides suitable procedures and test methods. While maintainability verification as such should be a mandatory part of any maintainability programme (see IEC 60300-3-10), each individual case requires appropriate methods to be carefully selected in order to ensure overall cost-effectiveness.

This standard also addresses the collection, analysis and presentation of maintainability related data, which may be required during, and at the completion of, design and during item production and operation.

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 60050(191):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 191: Dependability and quality of service*

IEC 60300-3-5, *Dependability management – Part 3-5: Application guide – Reliability test conditions and statistical test principles*

IEC 60300-3-10:2001, *Dependability management – Part 3-10: Application guide – Maintainability*

IEC 60300-3-12, *Dependability management – Part 3-12: Application guide – Integrated logistic support*

IEC 60300-3-14, *Dependability management – Part 3-14: Application guide – Maintenance and maintenance support*

IEC 60706-2, *Maintainability of equipment – Part 2 – Section Five: Maintainability studies during the design phase*²

IEC 61160, *Design review*

IEC 61649, *Goodness-of-fit tests, confidence intervals and lower confidence limits for Weibull distributed data*

IEC 61710, *Power law model – Goodness-of-fit tests and estimation methods*

² To be published.