SVENSK STANDARD SS-EN 60706-3

Fastställd	Utgåva	Sida	Ansvarig kommitté
2007-05-21	1	1 (1+38)	SEK TK 56

Underhållsmässighet – Del 3: Verifiering samt analys, insamling och presentation av data

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

Som svensk standard gäller europastandarden EN 60706-3:2006. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60706-3:2006.

Nationellt förord

Europastandarden EN 60706-3:2006[*)]

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC

– **IEC 60706-3, Second edition, 2006 - Maintainability of equipment - Part 3: Verification and collection, analysis and presentation of data**

utarbetad inom International Electrotechnical Commission, IEC.

[*)] EN 60706-3:2006 ikraftsattes 2007-05-21 som SS-EN 60706-3 genom offentliggörande, d v s utan utgivning av något svenskt dokument.

ICS 03.120.01; 21.020

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

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Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

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Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60706-3

July 2006

ICS 03.120.01; 21.020

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)

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

Ref. No. EN 60706-3:2006 E

SEK Svensk Elstandard

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).

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 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.

CONTENTS

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.

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*

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2 To be published.