SVENSK STANDARD SS-EN 60706-2

Fastställd	Utgåva	Sida	Ansvarig kommitté
2006-12-18	1	1 (1+52)	SEK TK 56

Underhållsmässighet hos utrustning – Del 2: Fordringar och studier i samband med konstruktion och utveckling

Maintainability of equipment – Part 2: Maintainability requirements and studies during the design and development phase

Som svensk standard gäller europastandarden EN 60706-2:2006. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60706-2:2006.

Nationellt förord

Europastandarden EN 60706-2:2006*)

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60706-2, Second edition, 2006 - Maintainability of equipment - Part 2: Maintainability requirements and studies during the design and development phase**

utarbetad inom International Electrotechnical Commission, IEC.

*) EN 60706-2:2006 ikraftsattes 2006-12-18 som SS-EN 60706-2 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.
Postadress: SEK, Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00. *Telefax*: 08 - 444 14 30
E-post: sek@elstandard.se. *Internet*: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

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.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

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.

Var med och påverka!

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.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60706-2

June 2006

ICS 03.120.01; 21.020

English version

Maintainability of equipment
Part 2: Maintainability requirements and studies during the design and development phase
(IEC 60706-2:2006)

Maintenabilité de matériel
Partie 2 : Exigences et études de maintenabilité pendant la phase de conception et de développement
(CEI 60706-2:2006)

Instandhaltbarkeit von Geräten
Teil 2: Instandhaltbarkeitsanforderungen und Studien in der Entwicklungsphase
(IEC 60706-2:2006)

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 60706-2:2006 E

SEK Svensk Elstandard

Foreword

The text of document 56/1090/FDIS, future edition 2 of IEC 60706-2, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60706-2 on 2006-05-01.

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)	2007-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2009-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60706-2:2006 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 in 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 60300-3-1	-[1)]	Dependability management Part 3-1: Application guide - Analysis techniques for dependability - Guide on methodology	EN 60300-3-1	2004[2)]
IEC 60300-3-3	-[1)]	Dependability management Part 3-3: Application guide - Life cycle costing	EN 60300-3-3	2004[2)]
IEC 60300-3-10	2001	Dependability management Part 3-10: Application guide - Maintainability	-	-
IEC 60300-3-11	-[1)]	Dependability management Part 3-11: Application guide - Reliability centred maintenance	-	-
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 60706-3	-[1)]	Maintainability of equipment Part 3: Verification and collection, analysis and presentation of data	-	-
IEC 60706-5	-[1)]	Guide on maintainability of equipment Part 5 - Section 4: Diagnostic testing	-	-
IEC 60812	-[1)]	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	EN 60812	2006[2)]
IEC 61025	-[1)]	Fault tree analysis (FTA)	HD 617 S1	1992[2)]
IEC 61160	-[1)]	Design review	EN 61160	2005[2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 61649	1997	Goodness-of-fit tests, confidence intervals and lower confidence limits for Weibull distributed data	-	-

CONTENTS

INTRODUCTION

Maintainability is a characteristic that defines the ease with which an item can be maintained and supported during its period of use. Maintainability has to be built into an item during the design and development phase and it is therefore important that maintainability requirements be established as part of the initial specification.

The IEC 60706 series of standards is intended to give guidance on how a designer should best incorporate high standards of maintainability into a product so that the cost of maintenance is reduced to an acceptable level. It is also important to ensure that the necessary maintenance can be undertaken to keep the product in a safe condition and that it can be operated to its required performance.

This International Standard gives an introduction to the concept of maintainability, and guidance as to how maintainability can be incorporated into specifications and contracts and how maintainability should be considered as part of the design process. It forms part of a hierarchy of standards on 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, including reliability, availability and maintainability, into manufactured products. IEC 60300-3-10 is the top-level standard on maintainability, serving as an application guide and 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 2: Maintainability requirements and studies during the design and development phase

1 Scope

This part of IEC 60706 examines the maintainability requirements and related design and use parameter, and discusses some activities necessary to achieve the required maintainability characteristics and their relationship to planning of maintenance. It describes the general approach in reaching these objectives and shows how maintainability characteristics should be specified in a requirements document or contract.

It is not intended to be a complete guide on how to specify or to contract for maintainability. Its purpose is to define the range of considerations when maintainability characteristics are included as requirements for the development or the acquisition of an item.

The standard goes on to describe maintainability studies in the preliminary and detailed design phases and their relationships to other maintainability and maintenance support tasks, described in associated standards. Maintainability considerations in design reviews are also included.

It is intended that customers acquiring items of equipment will find this standard useful in assisting them to define their maintainability objectives and associated maintainability programmes.

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 60300-3-1, *Dependability management – Part 3-1: Application guide – Analysis techniques for dependability – Guide on methodology*

IEC 60300-3-3, *Dependability management – Part 3-3: Application guide – Life cycle costing*

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

IEC 60300-3-11, *Dependability management – Part 3-11: Application guide – Reliability centred maintenance*

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 60706-3, *Guide on maintainability of equipment – Part 3: Sections Six and Seven – Verification and collection, analysis and presentation of data* [1]

IEC 60706-5, *Guide on maintainability of equipment – Part 5 – Section 4: Diagnostic testing*

IEC 60812, *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)*

IEC 61025, *Fault tree analysis (FTA)*

IEC 61160, *Design review*

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

---

1 A second edition is due to be published shortly under the revised title "*Maintainability of equipment – Part 3: Verification and collection, analysis and presentation of data*".