

Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)

Analysis techniques for system reliability –
Procedure for failure mode and effects analysis
(FMEA)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 60812:2006 sisaldab Euroopa standardi EN 60812:2006 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 28.08.2006 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 60812:2006 consists of the English text of the European standard EN 60812:2006.</p> <p>This document is endorsed on 28.08.2006 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This International Standard describes Failure Mode and Effects Analysis (FMEA) and Failure Mode, Effects and Criticality Analysis (FMECA), and gives guidance as to how they may be applied to achieve various objectives by – providing the procedural steps necessary to perform an analysis; – identifying appropriate terms, assumptions, criticality measures, failure modes; – defining basic principles; – providing examples of the necessary worksheets or other tabular forms.</p>	<p>Scope: This International Standard describes Failure Mode and Effects Analysis (FMEA) and Failure Mode, Effects and Criticality Analysis (FMECA), and gives guidance as to how they may be applied to achieve various objectives by – providing the procedural steps necessary to perform an analysis; – identifying appropriate terms, assumptions, criticality measures, failure modes; – defining basic principles; – providing examples of the necessary worksheets or other tabular forms.</p>
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ICS 03.120.01, 03.120.30, 21.020

Võtmesõnad:

English version

**Analysis techniques for system reliability –
Procedure for failure mode and effects analysis (FMEA)
(IEC 60812:2006)**

Techniques d'analyse
de la fiabilité du système –
Procédure d'analyse des modes
de défaillance et de leurs effets (AMDE)
(CEI 60812:2006)

Analysetechniken für
die Funktionsfähigkeit von Systemen –
Verfahren für die Fehlzustandsart-
und -auswirkungsanalyse (FMEA)
(IEC 60812:2006)

This European Standard was approved by CENELEC on 2006-03-01. 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 56/1072/FDIS, future edition 2 of IEC 60812, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60812 on 2006-03-01.

This European Standard supersedes HD 485 S1:1987.

The main changes from HD 485 S1:1987 are as follows:

- introduction of the failure modes effects and criticality concepts;
- inclusion of the methods used widely in the automotive industry;
- added references and relationships to other failure modes analysis methods;
- added examples;
- guidance on advantages and disadvantages of different FMEA methods.

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) 2006-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-03-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60812:2006 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 61160	NOTE	Harmonized as EN 61160:2005 (not modified).
ISO 9000	NOTE	Harmonized as EN ISO 9000:2000 (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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60300-3-1	2003	Dependability management Part 3-1: Application guide - Analysis techniques for dependability - Guide on methodology	EN 60300-3-1	2004
IEC 61025	- ¹⁾	Fault tree analysis (FTA)	HD 617 S1	1992 ²⁾
IEC 61078	- ¹⁾	Analysis techniques for dependability - Reliability block diagram and Boolean methods	EN 61078	2006 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

INTERNATIONAL STANDARD

**IEC
60812**

Second edition
2006-01

Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number
IEC 60812:2006(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

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IEC 60812

Second edition
2006-01

Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ANALYSIS TECHNIQUES FOR SYSTEM RELIABILITY –
PROCEDURE FOR FAILURE MODE
AND EFFECTS ANALYSIS (FMEA)**

FOREWORD

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International Standard IEC 60812 has been prepared by IEC technical committee 56: Dependability.

This second edition cancels and replaces the first edition published in 1985 and constitutes a technical revision.

The main changes from the previous edition are as follows:

- introduction of the failure modes effects and criticality concepts;
- inclusion of the methods used widely in the automotive industry;
- added references and relationships to other failure modes analysis methods;
- added examples;
- provided guidance of advantages and disadvantages of different FMEA methods.

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

FDIS	Report on voting
56/1072/FDIS	56/1091/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 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.

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ANALYSIS TECHNIQUES FOR SYSTEM RELIABILITY – PROCEDURE FOR FAILURE MODE AND EFFECTS ANALYSIS (FMEA)

1 Scope

This International Standard describes Failure Mode and Effects Analysis (FMEA) and Failure Mode, Effects and Criticality Analysis (FMECA), and gives guidance as to how they may be applied to achieve various objectives by

- providing the procedural steps necessary to perform an analysis;
- identifying appropriate terms, assumptions, criticality measures, failure modes;
- defining basic principles;
- providing examples of the necessary worksheets or other tabular forms.

All the general qualitative considerations presented for FMEA will apply to FMECA, since the latter is an extension of the other.

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 60300-3-1:2003, *Dependability management – Part 3-1: Application guide – Analysis techniques for dependability – Guide on methodology*

IEC 61025, *Fault tree analysis (FTA)*

IEC 61078, *Analysis techniques for dependability – Reliability block diagram method*

3 Terms and definitions

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

3.1

item

any part, component, device, subsystem, functional unit, equipment or system that can be individually considered

NOTE 1 An item may consist of hardware, software or both, and may also in particular cases include people.

NOTE 2 A number of items, e.g. a population of items or a sample, may itself be considered as an item.

[IEV 191-01-01]