SVENSK STANDARD SS-EN 61709

Fastställd	Utgåva	Sida	Ansvarig kommitté
2012-02-15	2	1 (1+89)	SEK TK 56

Funktionssäkerhet hos elektronikkomponenter – Referensbetingelser för felbenägenhet och stressmodeller för omräkning

Electronic components –
Reliability –
Reference conditions for failure rates and stress models for conversion

Som svensk standard gäller europastandarden EN 61709:2011. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61709:2011.

Nationellt förord

Europastandarden EN 61709:2011

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61709, Second edition, 2011 - Electronic components - Reliability - Reference conditions for failure rates and stress models for conversion**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61709, utgåva 1, 1998, gäller ej fr o m 2014-07-29.

ICS 31.020

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 61709

August 2011

ICS 31.020

Supersedes EN 61709:1998

English version

Electric components - Reliability - Reference conditions for failure rates and stress models for conversion

(IEC 61709:2011)

Composants électriques - Fiabilité - Conditions de référence pour les taux de défaillance et modèles de contraintes pour la conversion (CEI 61709:2011)

Elektrische Bauelemente - Zuverlässigkeit - Referenzbedingungen für Ausfallraten und Beanspruchungsmodelle zur Umrechnung (IEC 61709:2011)

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61709:2011 E

SEK Svensk Elstandard

Foreword

The text of document 56/1422/FDIS, future edition 2 of IEC 61709, prepared by IEC TC 56, Dependability, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61709 on 2011-07-29.

This European Standard supersedes EN 61709:1998.

EN 61709:2011 includes the following significant technical changes with respect to EN 61709:1998:

– the addition of a number of component types and the updating of models for a large number of component types;

– the addition of annexes on reliability prediction, sources of failure rate data and component classification information.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2012-04-29
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-07-29

Annex ZA has been added by CENELEC.

———————

Endorsement notice

The text of the International Standard IEC 61709:2011 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 60300-3-2:2004	NOTE	Harmonized as EN 60300-3-2:2005 (not modified).
IEC 60721 series	NOTE	Harmonized in EN 60721 series.
IEC 61360 series	NOTE	Harmonized in EN 61360 series.
IEC 61360-1:2009	NOTE	Harmonized as EN 61360-1:2010 (not modified).
IEC 61360-4:2005	NOTE	Harmonized as EN 61360-4:2005 (not modified).
IEC 61649:2008	NOTE	Harmonized as EN 61649:2008 (not modified).
IEC 61703	NOTE	Harmonized as EN 61703.
IEC 62308	NOTE	Harmonized as EN 62308.
ISO 10303-11:1994	NOTE	Harmonized as EN ISO 10303-11:1995 (not modified).
ISO 10303-31	NOTE	Harmonized as EN ISO 10303-31.

———————

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	-	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 60605-6	-	Equipment reliability testing - Part 6: Tests for the validity and estimation of the constant failure rate and constant failure intensity	-	-
IEC 60721-3-3	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weatherprotected locations	EN 60721-3-3	-
IEC 60721-3-4	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weatherprotected locations	EN 60721-3-4	-
IEC 60721-3-5	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations	EN 60721-3-5	-
IEC 60721-3-7	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 7: Portable and non-stationary use	EN 60721-3-7	-

CONTENTS

INTRODUCTION

This International Standard is intended for the reliability prediction of components as used in equipment and is aimed at organizations that have their own data and describes how to state and use that data in order to perform reliability predictions.

It can also be used to allow an organization to set up a failure rate database and describes the reference conditions for which field failure rates should be stated. The reference conditions adopted in this standard are typical of the majority of applications of components in equipment however when components operate under other conditions the users may consider stating these conditions as their reference conditions.

Using the presented stress models allows extrapolation of failure rates to other operating conditions which in turn permits the prediction of failure rates at assembly level. This allows estimation of the effect of design changes or changes in the environmental conditions on component reliability. Reliability prediction is most useful in the early design phase of electrical equipment. It can be used, for example, to identify potential reliability problems, the planning of logistic support strategies and the evaluation of designs.

The stress models contained herein are generic and are as simple as possible while still being comparable with more complex equations contained in other models.

This standard does not contain failure rates, but it describes how they can be stated and used. This approach allows a user to select the most relevant and up to date failure rates for the prediction from a source that they select. This standard also contains information on how to select the data that can be used in the presented models.

ELECTRIC COMPONENTS – RELIABILITY – REFERENCE CONDITIONS FOR FAILURE RATES AND STRESS MODELS FOR CONVERSION

1 Scope

This International Standard gives guidance on how failure rate data can be employed for reliability prediction of electric components in equipment.

Reference conditions are numerical values of stresses that are typically observed by components in the majority of applications. Reference conditions are useful since they are the basis of the calculation of failure rate under any conditions by the application of stress models that take into account the actual operating conditions. Failure rates stated at reference conditions allow realistic reliability predictions to be made in the early design phase.

The stress models described herein are generic and can be used as a basis for conversion of the failure rate data at these reference conditions to actual operating conditions when needed and this simplifies the prediction approach. Conversion of failure rate data is only permissible within the specified functional limits of the components.

This standard also gives guidance on how a database of component failure data can be constructed to provide failure rates that can be used with the included stress models. Reference conditions for failure rate data are specified, so that data from different sources can be compared on a uniform basis. If failure rate data are given in accordance with this International Standard then no additional information on the specified conditions is required.

This standard does not provide base failure rates for components – rather it provides models that allow failure rates obtained by other means to be converted from one operating condition to another operating condition.

The prediction methodology described in this standard assumes that the parts are being used within its useful life. The methods in this standard have a general application but are specifically applied to a selection of component types as defined in Clause 6 and Clause E.2.

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, *International Electrotechnical Vocabulary – Part 191: Dependability and quality of service*

IEC 60605-6, *Equipment reliability testing – Part 6: Tests for the validity and estimation of the constant failure rate and constant failure intensity*

IEC 60721-3-3, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weather protected locations*

IEC 60721-3-4, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weatherprotected locations*

IEC 60721-3-5, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Ground vehicle installations*

IEC 60721-3-7, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 7: Portable and non-stationary use*