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**Oprema za merjenje električne energije - Zagotovljivost - 31-1. del: Pospešeno preskušanje zanesljivosti - Povišana temperatura in povečana vlažnost (IEC 62059-31-1:2008)**

Electricity metering equipment - Dependability - Part 31-1: Accelerated reliability testing - Elevated temperature and humidity (IEC 62059-31-1:2008)

Elektrizitászähler - Zuverlässigkeit - Teil 31-1: Zeitraffende Zuverlässigkeitsprüfung - Temperatur und Luftfeuchte erhöht (IEC 62059-31-1:2008)

Equipements de comptage de l'électricité - Sûreté de fonctionnement - Partie 31-1: Essais de fiabilité accélérés - Température et humidité élevées (CEI 62059-31-1:2008)

**Ta slovenski standard je istoveten z: EN 62059-31-1:2008**

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**Electricity metering equipment -  
Dependability -  
Part 31-1: Accelerated reliability testing -  
Elevated temperature and humidity  
(IEC 62059-31-1:2008)**

Equipements de comptage de l'électricité -  
Sûreté de fonctionnement -  
Partie 31-1: Essais de fiabilité accélérés -  
Température et humidité élevées  
(CEI 62059-31-1:2008)

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Temperatur und Luftfeuchte erhöht  
(IEC 62059-31-1:2008)

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SIST EN 62059-31-1:2009

This European Standard was approved by CENELEC on 2008-11-01. 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.

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**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 13/1437A/FDIS, future edition 1 of IEC 62059-31-1, prepared by IEC TC 13, Electrical energy measurement, tariff- and load control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62059-31-1 on 2008-11-01.

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) 2009-08-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-11-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62059-31-1:2008 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 61124	NOTE Harmonized as EN 61124:2006 (not modified).
IEC 61163-1	NOTE Harmonized as EN 61163-1:2006 (not modified).
IEC 61164	NOTE Harmonized as EN 61164:2004 (not modified).
IEC 61709	NOTE Harmonized as EN 61709:1998 (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 60050-191	1990	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 60300-3-5	2001	Dependability management - Part 3-5: Application guide - Reliability test conditions and statistical test principles	-	-
IEC 61649	2008	Weibull analysis	EN 61649	2008
IEC 61703	2001	Mathematical expressions for reliability, availability, maintainability and maintenance support terms	EN 61703	2002
IEC/TR 62059-11	2002	Electricity metering equipment - Dependability - Part 11: General concepts	-	-
IEC/TR 62059-21	2002	Electricity metering equipment - Dependability - Part 21: Collection of meter dependability data from the field	-	-
IEC 62059-41	2006	Electricity metering equipment - Dependability - Part 41: Reliability prediction	EN 62059-41	2006
IEC 62308	2006	Equipment reliability - Reliability assessment methods	EN 62308	2006

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IEC 62059-31-1

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# NORME INTERNATIONALE

**Electricity metering equipment – Dependability –  
Part 31-1: Accelerated reliability testing – Elevated temperature and humidity**  
(standards.itec.ai)

**Equipements de comptage de l'électricité – Sûreté de fonctionnement –  
Partie 31-1: Essais de fiabilité accélérés – Température et humidité élevées**

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## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions.....	9
4 Symbols, acronyms and abbreviations.....	14
5 Description of quantitative accelerated life tests.....	15
5.1 Introduction.....	15
5.2 The life distribution.....	15
5.3 The life-stress model.....	15
6 The Weibull distribution.....	16
6.1 Introduction.....	16
6.2 Graphical representation.....	16
6.3 Calculation of the distribution parameters.....	19
6.3.1 Input data to be used.....	19
6.3.2 Ranking of the time to failure.....	19
6.3.3 Reliability / unreliability estimates.....	20
6.3.4 Calculation of the parameters.....	21
7 The life-stress model.....	25
7.1 General.....	25
7.2 Linear equation of the acceleration factor.....	26
7.3 Calculation of parameters $n$ and $E_a$ .....	27
8 The quantitative accelerated life testing method.....	28
8.1 Selection of samples.....	28
8.2 The steps to check product life characteristics.....	28
8.3 Procedure for terminating the maximum stress level test.....	29
8.4 Procedure to collect time to failure data and to repair meters.....	29
9 Definition of normal use conditions.....	29
9.1 Introduction.....	29
9.2 Temperature and humidity conditions.....	30
9.2.1 Equipment for outdoor installation.....	30
9.2.2 Equipment for indoor installation.....	31
9.3 Temperature correction due to variation of voltage and current.....	31
9.3.1 Definition of the normal use profile of voltage and current.....	32
9.3.2 Measurement of the meter internal temperature at each current and voltage.....	32
9.3.3 Calculation of the meter average internal temperature.....	32
9.4 Other conditions.....	34
10 Classification and root cause of failures.....	34
11 Presentation of the results.....	34
11.1 Information to be given.....	34
11.2 Example.....	35
12 Special cases.....	35
12.1 Cases of simplification.....	35
12.1.1 Minor evolution of product design.....	35



12.1.2	Verification of production batches .....	35
12.2	Cases when additional information is needed .....	35
12.2.1	The $\beta$ parameter changes significantly from maximum stress level to medium or low stress level .....	35
12.2.2	Fault mode different between stress levels .....	35
Annex A (informative)	Basic statistical background .....	36
Annex B (informative)	The characteristics of the Weibull distribution .....	38
Annex C (informative, see also draft IEC 62308)	Life-stress models .....	42
Annex D (normative)	Rank tables .....	44
Annex E (normative)	Values of the Gamma function $\Gamma(n)$ .....	47
Annex F (normative)	Calculation of the minimum duration of the maximum stress level test .....	48
Annex G (informative)	Example .....	54
	Bibliography .....	84
	INDEX .....	85
	Figure 1 – Weibull unreliability representation example with $\gamma = 3\ 000$ , $\beta = 1,1$ , $\eta = 10\ 000$ ...	19
	Figure 2 – Example of graphical representation of $F(t)$ in the case of Weibull distribution .....	25
	Figure 3 – Example of regional climatic conditions .....	30
	Figure 4 – Calculation of average year use conditions .....	31
	Figure A.1 – The probability density function .....	36
	Figure A.2 – The reliability and unreliability functions .....	37
	Figure B.1 – Effect of the $\beta$ parameter on the Weibull probability density function $f(t)$ .....	39
	Figure B.2 – Effect of the $\eta$ parameter on the Weibull probability density function $f(t)$ .....	40
	Figure F.1 – Unreliability at normal use conditions .....	49
	Figure F.2 – Unreliability at maximum stress level .....	50
	Figure G.1 – Graphical representation of display failures for each stress level .....	63
	Figure G.2 – Graphical representation of Q2 failures for each stress level .....	64
	Figure G.3 – Graphical representation of U1 failures for each stress level .....	65
	Figure G.4 – Example of climate data .....	67
	Figure G.5 – Graphical representation of all failures at normal use conditions .....	76
	Figure G.6 – Final cumulative distribution with confidence intervals .....	81
	Figure G.7 – Reliability function extrapolated to normal use conditions .....	82
	Figure G.8 – Reliability function extrapolated to normal use conditions (First portion magnified) .....	83
	Table 1 – Construction of ordinate (Y) .....	17
	Table 2 – Construction of abscissa (t- $\gamma$ ) .....	17
	Table 3 – Equations format entered into a spreadsheet .....	18
	Table 4 – Example with $\gamma = 3\ 000$ , $\beta = 1,1$ , $\eta = 10\ 000$ .....	18
	Table 5 – Example of ranking process of times to failure .....	20
	Table 6 – Unreliability estimates by median rank .....	21
	Table 7 – Example of unreliability estimation for Weibull distribution .....	24

Table 8 – Example of 90 % confidence bounds calculation for Weibull distribution .....	24
Table 9 – Values of the linear equation .....	27
Table 10 – Example of procedure for temperature correction .....	33
Table G.1 – Failures logged at 85 °C with $RH = 95\%$ .....	57
Table G.2 – Failures logged at 85 °C with $RH = 85\%$ .....	59
Table G.3 – Failures logged at 85 °C with $RH = 75\%$ .....	60
Table G.4 – Failures logged at 75 °C with $RH = 95\%$ .....	61
Table G.5 – Failures logged at 65 °C with $RH = 95\%$ .....	62
Table G.6 – Best fit Weibull distributions for display failures .....	63
Table G.7 – Best fit Weibull distributions for Q2 failures.....	64
Table G.8 – Best fit Weibull distributions for U1 failures.....	65
Table G.9 – Values of the linear equation for display failures .....	66
Table G.10 – Values of the linear equation for Q2 failures .....	66
Table G.11 – Values of the linear equation for other failures .....	66
Table G.12 – Normal use profile of voltage and current.....	67
Table G.13 – Measurement of the internal temperature.....	69
Table G.14 – Arrhenius acceleration factors compared to temperature measured at $U_n$ and $0,1 I_{max}$ , for display failures .....	70
Table G.15 – Arrhenius acceleration factors compared to temperature measured at $U_n$ and $0,1 I_{max}$ , for Q2 failures .....	71
Table G.16 – Arrhenius acceleration factors compared to temperature measured at $U_n$ and $0,1 I_{max}$ , for U1 failures .....	72
Table G.17 – Display failures extrapolated to normal use conditions .....	74
Table G.18 – Q2 failures extrapolated to normal use conditions .....	75
Table G.19 – U1 failures extrapolated to normal use conditions .....	76
Table G.20 – Best fit Weibull distributions at normal use conditions .....	77
Table G.21 – Display failures 90 % confidence bounds calculation .....	78
Table G.22 – Q2 failures 90 % confidence bounds calculation .....	79
Table G.23 – U1 failures 90 % confidence bounds calculation .....	80

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICITY METERING EQUIPMENT –  
DEPENDABILITY –****Part 31-1: Accelerated reliability testing –  
Elevated temperature and humidity**

## 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 62059-31 has been prepared by IEC technical committee 13: Electrical energy measurement, tariff- and load control.

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

FDIS	RVD
13/1437A/FDIS	13/1444/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.

A list of all parts of IEC 62059 series, under the general title *Electricity metering equipment – Dependability*, can be found on the IEC website.

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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## INTRODUCTION

Electricity metering equipment are products designed for high reliability and long life under normal operating conditions, operating continuously without supervision. To manage metering assets effectively, it is important to have tools for predicting and estimating life characteristics of various types.

IEC 62059-41 provides methods for predicting the failure rate – assumed to be constant – of metering equipment based on the parts stress method.

IEC 62059-31-1 provides a method for estimating life characteristics using temperature and humidity accelerated testing.

It is practically impossible to obtain data about life characteristics by testing under normal operating conditions. Therefore, accelerated reliability test methods have to be used.

During accelerated reliability testing, samples taken from a defined population are operated beyond their normal operating conditions, applying stresses to shorten the time to failure, but without introducing new failure mechanisms.

The estimation is performed by recording and analysing failures during such accelerated testing, establishing the failure distribution under the test conditions and, using life stress models, extrapolating failure distribution under accelerated conditions of use to normal conditions of use.

The method provides quantitative results with their confidence limits and may be used to compare life characteristics of products coming from different suppliers or different batches from the same supplier.

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## ELECTRICITY METERING EQUIPMENT – DEPENDABILITY –

### Part 31-1: Accelerated reliability testing – Elevated temperature and humidity

#### 1 Scope

This part of IEC 62059 provides one of several possible methods for estimating product life characteristics by accelerated reliability testing.

Acceleration can be achieved in a number of different ways. In this particular standard, elevated, constant temperature and humidity is applied to achieve acceleration. The method also takes into account the effect of voltage and current variation.

Of course, failures not (or not sufficiently) accelerated by temperature and humidity will not be detected by the application of the test method specified in this standard.

Other factors, like temperature variation, vibration, dust, voltage dips and short interruptions, static discharges, fast transient burst, surges, etc. – although they may affect the life characteristics of the meter – are not taken into account in this standard; they may be addressed in future parts of the IEC 62059 series.

This standard is applicable to all types of metering equipment for energy measurement, tariff- and load control in the scope of IEC TC 13. The method given in this standard may be used for estimating (with given confidence limits) product life characteristics of such equipment prior to and during serial production. This method may also be used to compare different designs.

#### 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 Ed. 1.0:2001, *Dependability management – Part 3-5: Application guide – Reliability test conditions and statistical test principles*

IEC 61649 Ed 2.0: 2008, *Goodness-of-fit tests, confidence intervals and lower confidence limits for Weibull distributed data*

IEC 61703 Ed. 1.0: 2001, *Mathematical expressions for reliability, availability, maintainability and maintenance support terms*

IEC/TR 62059-11 Ed 1.0:2002, *Electricity metering equipment – Dependability – Part 11: General concepts*

IEC/TR 62059-21 Ed. 1.0:2002, *Electricity metering equipment – Dependability – Part 21: Collection of meter dependability data from the field*

IEC 62059-41 Ed. 1.0: 2006, *Electricity metering equipment – Dependability – Part 41: Reliability prediction*

IEC 62308 Ed. 1.0:2006, *Equipment reliability – Reliability assessment methods*

### 3 Terms and definitions

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

NOTE 1 Here only those terms relevant to the subject are included, which have not been already included in IEC 62059-11.

#### 3.1

##### **accelerated life test**

a test in which the applied stress level is chosen to exceed that stated in the reference conditions in order to shorten the time duration required to observe the stress response of the item, or to magnify the response in a given time duration

NOTE To be valid, an accelerated life test shall not alter the basic fault modes and failure mechanisms, or their relative prevalence.

[IEV 191-14-07, modified]

#### 3.2

##### **ageing failure, wear-out failure**

a failure whose probability of occurrence increases with the passage of time, as a result of processes inherent in the item (standards.iteh.ai)

[IEV 191-04-09]

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#### 3.3

##### **burn-in (for repairable hardware)**

a process of increasing the reliability performance of hardware employing functional operation of every item in a prescribed environment with successive corrective maintenance at every failure during the early failure period

[IEV 191-17-02]

#### 3.4

##### **burn-in (for a non-repairable item)**

a type of screening test employing the functional operation of an item

[IEV 191-17-03]

#### 3.5

##### **censoring**

termination of the test after either a certain number of failures or a certain time at which there are still items functioning

[IEC 60300-3-5, 3.1.2]

#### 3.6

##### **constant failure intensity period**

that period, if any, in the life of a repaired item during which the failure intensity is approximately constant

[IEV 191-10-08]