

---

**Industrial-process measurement and control - Evaluation of system properties for the purpose of system assessment - Part 5: Assessment of system dependability (IEC 61069-5:1994)**

Industrial-process measurement and control - Evaluation of system properties for the purpose of system assessment -- Part 5: Assessment of system dependability

Leittechnik für industrielle Prozesse - Ermittlung der Systemeigenschaften zum Zweck der Eignungsbeurteilung eines Systems -- Teil 5: Eignungsbeurteilung der System-Verlässlichkeit

Mesure et commande dans les processus industriels - Appréciation des propriétés d'un système en vue de son évaluation -- Partie 5: Evaluation de la sûreté de fonctionnement d'un système

**Ta slovenski standard je istoveten z: EN 61069-5:1995**

---

**ICS:**

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
-----------	--	--

**SIST EN 61069-5:1998****en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 61069-5:1998

<https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ae7-9b39-cfa8e6e10c22/sist-en-61069-5-1998>

ICS 25.040.40

Descriptors: Industrial-process, measurement and control, system assessment, evaluation of system properties, assessment of system dependability

English version

**Industrial-process measurement and control  
Evaluation of system properties for the purpose  
of system assessment  
Part 5: Assessment of system dependability  
(IEC 1069-5:1994)**

Mesure et commande dans les  
processus industriels  
Appréciation des propriétés d'un  
système en vue de son évaluation  
Partie 5: Evaluation de la sûreté de  
fonctionnement d'un système  
(CEI 1069-5:1994)

Leittechnik für industrielle Prozesse  
Ermittlung der Systemeigenschaften  
zum Zweck der Eignungsbeurteilung  
eines Systems  
Teil 5: Eignungsbeurteilung der  
System-Verlässlichkeit  
(IEC 1069-5:1994)

This European Standard was approved by CENELEC on 1995-02-15. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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

© 1995 Copyright reserved to CENELEC members

**ITEH STANDARD PREVIEW**  
**(standards.iteh.ai)**

Ref. No. EN 61069-5:1995 E

[SIST EN 61069-5:1998](https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998)

[https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-](https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998)

[cfa8e6e10c22/sist-en-61069-5-1998](https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998)

### Foreword

The text of document 65A(CO)37, future edition 1 of IEC 1069-5, prepared by SC 65A, System aspects, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61069-5 on 1995-02-15.

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) 1996-02-15
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-02-15

Annexes designated "normative" are part of the body of the standard.  
Annexes designated "informative" are given for information only.  
In this standard, annex ZA is normative and annexes A, B, C and D are informative.  
Annex ZA has been added by CENELEC.

The relation of this part to the other parts of EN 61069 and the relative place of this part within the standard is shown in figure 1.

Part 1 provides the overall guidance and as such is intended as a stand-alone publication.

Part 2 details the assessment methodology.

Parts 3 to 8 provide guidance on the assessment of specific groups of properties.

The division of properties in parts 3 to 8 have been chosen so as to group together related properties.

---

### Endorsement notice

The text of the International Standard IEC 1069-5:1994 was approved by CENELEC as a European Standard without any modification.

---

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD  
WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

NOTE : When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
50(191)	1990	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
68	series	Environmental testing	HD 323 EN 60068	series series
300-3-2	1993	Dependability management Part 3: Application guide Section 2: Collection of dependability data from the field	-	-
706-4	1992	Guide on maintainability of equipment Part 4: Section 8: Maintenance and maintenance support planning	-	-
801	series	Electromagnetic compatibility for industrial-process measurement and control equipment	HD 481 EN 60801	series series
812	1985	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	HD 485 S1	1987
863	1986	Presentation of reliability, maintainability and availability predictions	-	-
1000	series	Electromagnetic compatibility (EMC)	EN 61000	series
1025	1990	Fault tree analysis (FTA)	HD 617 S1	1992
1069-1	1991	Industrial-process measurement and control - Evaluation of system properties for the purpose of system assessment - Part 1: General considerations and methodology	EN 61069-1	1993

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 61069-5:1998

[https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-](https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998)

[cfa8e6e10c22/sist-en-61069-5-1998](https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998)

IEC Publication -----	Date -----	Title -----	EN/HD -----	Date -----
1069-2	1993	Part 2: Assessment methodology	EN 61069-2	1994
1070	1991	Compliance test procedures for steady-state availability	-	-
1078	1991	Analysis techniques for dependability Reliability block diagram method	EN 61078	1993
1132	199x	Failure rate prediction of items having a series structure (in preparation)	-	-
1165	1995	Application of Markov techniques	-	-

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC

61069-5

Première édition  
First edition  
1994-12

---

---

**Mesure et commande dans les processus  
industriels –  
Appréciation des propriétés d'un système  
en vue de son évaluation –**

**Partie 5:**  
**Evaluation de la sûreté de fonctionnement  
d'un système**

<https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-1022651161069-5-1998>

**Industrial-process measurement and control –  
Evaluation of system properties for  
the purpose of system assessment –**

**Part 5:**  
**Assessment of system dependability**

© IEC 1994 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission  
Telefax: +41 22 919 0300

3, rue de Varembe Geneva, Switzerland  
e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

V

Pour prix, voir catalogue en vigueur  
For price, see current catalogue

## CONTENTS

	Page
FOREWORD .....	5
INTRODUCTION .....	9
Clause	
1 Scope .....	13
2 Normative references .....	13
3 Definitions .....	15
4 Dependability properties .....	17
4.1 General .....	17
4.2 Dependability .....	17
4.3 Availability .....	19
4.4 Reliability .....	21
4.5 Maintainability .....	21
4.6 Credibility .....	21
4.7 Security .....	23
4.8 Integrity .....	23
5 Review of the system requirements document .....	23
6 Review of the system specification document .....	25
7 Assessment procedure .....	27
7.1 General .....	27
7.2 Analysis of the system requirements document and system specification document ...	27
7.3 Designing the assessment programme .....	31
7.4 Assessment programme .....	33
8 Evaluation techniques .....	35
8.1 General .....	35
8.2 Qualitative evaluation techniques .....	35
8.3 Quantitative evaluation techniques .....	37
9 Execution and reporting of the assessment .....	43
Figures	
1 General layout of IEC 1069 .....	11
2 Dependability hierarchy .....	17
Annexes	
A Example of required information and documentation format for a master-slave control task in a system requirements document .....	47
B Example of required information and documentation format for master-slave control task in a system specification document .....	51
C Credibility tests .....	53
D Bibliography .....	61



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL-PROCESS MEASUREMENT AND CONTROL –  
EVALUATION OF SYSTEM PROPERTIES FOR  
THE PURPOSE OF SYSTEM ASSESSMENT –**

**Part 5: Assessment of system dependability**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 1069-5 has been prepared by sub-committee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement and control.

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

DIS	Report on voting
65A(CO)37	65A/166/RVD

Full information on the voting for the approval of this part can be found in the report on voting indicated in the above table.

Annexes A, B, C and D are for information only.

The relation of this part to the other parts of IEC 1069 and the relative place of this part within the standard is shown in figure 1.

Part 1 provides the overall guidance and as such is intended as a stand-alone publication.

Part 2 details the assessment methodology.

Parts 3 to 8 provide guidance on the assessment of specific groups of properties.

The division of properties in parts 3 to 8 have been chosen so as to group together related properties.

IEC 1069 consists of the following parts, under the general title: *Industrial-process measurement and control – Evaluation of system properties for the purpose of system assessment*:

- Part 1: General considerations and methodology
- Part 2: Assessment methodology
- Part 3: Assessment of system functionality (*under consideration*)
- Part 4: Assessment of system performance (*under consideration*)
- Part 5: Assessment of system dependability
- Part 6: Assessment of system operability (*under consideration*)
- Part 7: Assessment of system safety (*under consideration*)
- Part 8: Assessment of non-task-related system properties (*under consideration*)

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61069-5:1998

<https://standards.iteh.ai/catalog/standards/sist/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998>

## INTRODUCTION

This part of IEC 1069 deals with the method which should be used to assess the dependability of industrial-process measurement and control systems. Assessment of a system is the judgement, based on evidence, of the system's suitability for a specific mission or class of missions.

To obtain total evidence would require a complete (i.e. under all influencing conditions) evaluation of all system properties relevant to the specific mission or class of missions. Since this is rarely practical, the rationale on which an assessment of a system should be based is:

- to identify the criticality of each of the relevant system properties;
- to plan for evaluation of the relevant system properties with a cost-effective dedication of effort to the various properties.

In conducting an assessment of a system, it is crucial to bear in mind the need to gain a maximum increase in confidence in the suitability of a system within practical cost and time constraints.

An assessment can only be carried out if a mission has been stated (or given) or if any mission can be hypothesized. In the absence of a mission, no assessment can be made; however, evaluations (as defined in IEC 1069-1) can still be specified and be carried out for use in assessments performed by others. In such cases, the standard can be used as a guide for planning an evaluation and it provides procedures for performing evaluations, since evaluations are an integral part of assessment.

iTech STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 1069-5:1998  
<https://standards.iteh.ai/en/155e321a-c7d6-4ac7-9b39-cfa8e6e10c22/sist-en-61069-5-1998>

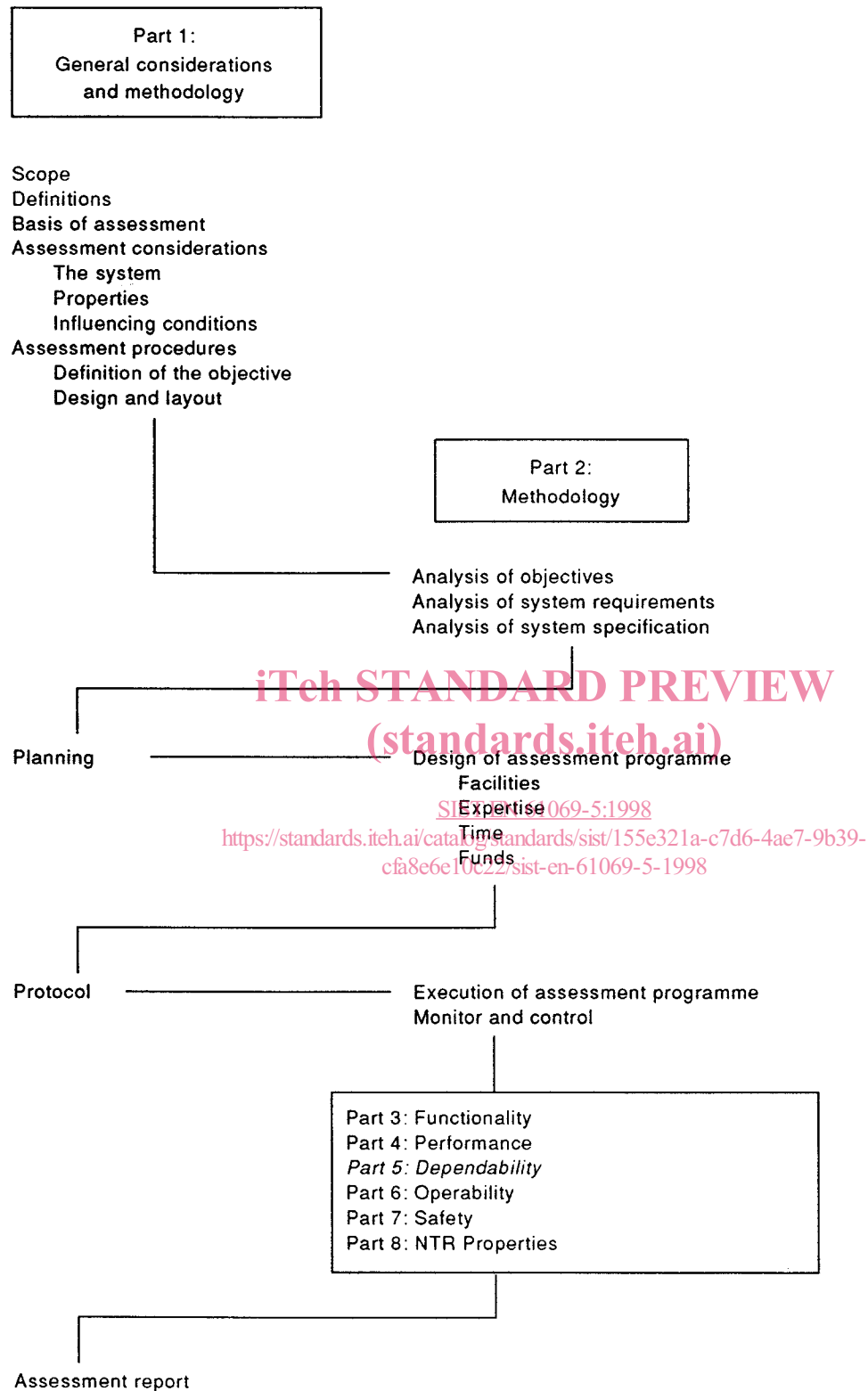


Figure 1 – General layout of IEC 1069