BS EN 61069-8:2016

BSI Standards Publication

Industrial-process measurement, control and automation — Evaluation of system properties for the purpose of system assessment

Part 8: Assessment of other system properties

bsi.

National foreword

This British Standard is the UK implementation of EN 61069-8:2016. It is identical to IEC 61069-8:2016. It supersedes BS EN 61069-8:1999 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/65, Measurement and control, to Subcommittee GEL/65/1, System considerations.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2016

ISBN 978 0 580 85998 4
ICS 25.040.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2016.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61069-8

September 2016

ICS 25.040.40

Supersedes EN 61069-8:1999

English Version

Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 8: Assessment of other system properties (IEC 61069-8:2016)

Mesure, commande et automation dans les processus industriels - Appréciation des propriétés d'un sytème en vue de son évaluation - Partie 8: Evaluation des autres propriétés d'un système
(IEC 61069-8:2016)

Leittechnik für industrielle Prozesse - Ermittlung der Systemeigenschaften zum Zweck der Eignungsbeurteilung eines Systems - Teil 8: Auswertung anderer Systemeigenschaften
(IEC 61069-8:2016)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 65A/796/FDIS, future edition 2 of IEC 61069-8, prepared by SC 65A "System aspects", of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61069-8:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-04-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-07-20

This document supersedes EN 61069-8:1999.

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

Endorsement notice

The text of the International Standard IEC 61069-8:2016 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 60300-2	NOTE	Harmonized as EN 60300-2.
IEC 61069-3:2016	NOTE	Harmonized as EN 61069-3:201X [1)] (not modified).
IEC 61069-4:2016	NOTE	Harmonized as EN 61069-4:201X [1)] (not modified).
IEC 61069-5:2016	NOTE	Harmonized as EN 61069-5:2016 (not modified).
IEC 61069-6:2016	NOTE	Harmonized as EN 61069-6:2016 (not modified).
IEC 61069-7:2016	NOTE	Harmonized as EN 61069-7:2016 (not modified).

1) To be published.

IEC 61082-1	NOTE	Harmonized as EN 61082-1.
IEC 61082-2 [2)]	NOTE	Harmonized as EN 61082-2.
IEC 61082-3 [2)]	NOTE	Harmonized as EN 61082-3.
IEC 61082-4 [2)]	NOTE	Harmonized as EN 61082-4.
IEC 61187	NOTE	Harmonized as EN 61187.
IEC 61346-1 [3)]	NOTE	Harmonized as EN 61346-1.
IEC 61346-2 [3)]	NOTE	Harmonized as EN 61346-2.
IEC 61355	NOTE	Harmonized in EN 61355 series.
IEC 61508	NOTE	Harmonized in EN 61508 series.
IEC/TS 62603-1	NOTE	Harmonized as CLC/TS 62603-1.
ISO 19011	NOTE	Harmonized as EN ISO 19011.
ISO 9000	NOTE	Harmonized as EN ISO 9000.
ISO 9001	NOTE	Harmonized as EN ISO 9001.

2) Superseded by IEC 61082-1:2006, *Preparation of documents used in electrotechnology - Part 1: Rules*, harmonized as EN 61082-1:2006.

3) Superseded by IEC 81346-1:2009, *Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations – Part 1: Basic rules*, harmonized as EN 81346-1:2009.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61069-1	2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 1: Terminology and basic concepts	EN 61069-1	201X [4)]
IEC 61069-2	2016	Industrial-process measurement, control and automation - Evaluation of system properties for the purpose of system assessment - Part 2: Assessment methodology	EN 61069-2	201X [4)]

4) To be published.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

Part 8: Assessment of other system properties

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61069-8 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 1999. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) reorganization of the material of IEC 61069-8:1999 to make the overall set of standards more organized and consistent;
b) IEC TS 62603-1 has been incorporated into this edition.

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

FDIS	Report on voting
65A/796/FDIS	65A/806/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 in the IEC 61069 series, published under the general title *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 61069 deals with the method which should be used to assess system properties of a basic control system (BCS). IEC 61069 consists of the following parts.

Part 1: Terminology and basic concepts

Part 2: Assessment methodology

Part 3: Assessment of system functionality

Part 4: Assessment of system performance

Part 5: Assessment of system dependability

Part 6: Assessment of system operability

Part 7: Assessment of system safety

Part 8: Assessment of other system properties

Assessment of a system is the judgement, based on evidence, of the suitability of the system for a specific mission or class of missions.

To obtain total evidence would require complete evaluation (for example under all influencing factors) 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:

– the identification of the importance of each of the relevant system properties,
– the planning for evaluation of the relevant system properties with a cost-effective dedication of effort to the various system 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 can still be specified and carried out for use in assessments performed by others. In such cases, IEC 61069 can be used as a guide for planning an evaluation and it provides methods for performing evaluations, since evaluations are an integral part of assessment.

In preparing the assessment, it can be discovered that the definition of the system is too narrow. For example, a facility with two or more revisions of the control systems sharing resources, for example a network, should consider issues of co-existence and inter-operability. In this case, the system to be investigated should not be limited to the “new” BCS; it should include both. That is, it should change the boundaries of the system to include enough of the other system to address these concerns.

The series structure and the relationship among the parts of IEC 61069 are shown in Figure 1.

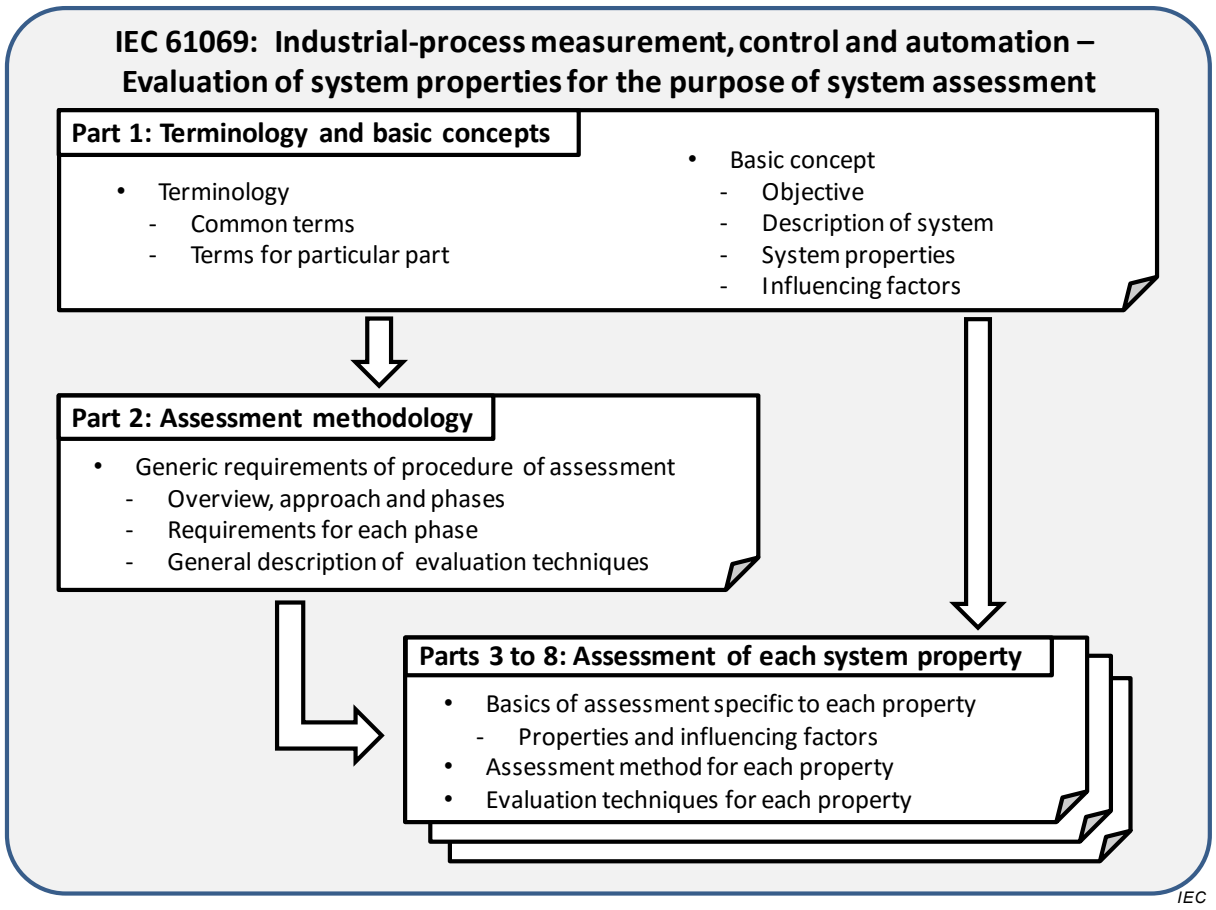

Figure 1 – General layout of IEC 61069

Some example assessment items are integrated in Annex C.

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

Part 8: Assessment of other system properties

1 Scope

This part of IEC 61069:

– specifies the detailed method of the assessment of other system properties of a basic control system (BCS) based on the basic concepts of IEC 61069-1 and methodology of IEC 61069-2,

– defines basic categorization of other system properties,

– describes the factors that influence other system properties and which need to be taken into account when evaluating other system properties, and

– provides guidance in selecting techniques from a set of options (with references) for evaluating the other system properties.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61069-1:2016, *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 1: Terminology and basic concepts*

IEC 61069-2:2016, *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 2: Assessment methodology*

3 Terms, definitions, abbreviated terms, acronyms, conventions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61069-1 apply.

3.2 Abbreviated terms, acronyms, conventions and symbols

For the purposes of this document, the abbreviated terms, acronyms, conventions and symbols given in IEC 61069-1 apply.

4 Basis of assessment specific to other system properties

4.1 Other system properties

4.1.1 General

Those properties which are not already addressed in IEC 61069-3 to IEC 61069-7 are classified under the category of "other system properties” (OSP).

These are properties covering multiple areas or may not be directly related to any task or function.

Nevertheless, this category of OSP is of importance for the effective use of a system to accomplish its mission, during the installation, operational, decommissioning and disposal phases of its life cycle.

OSP are categorized as shown in Figure 2.

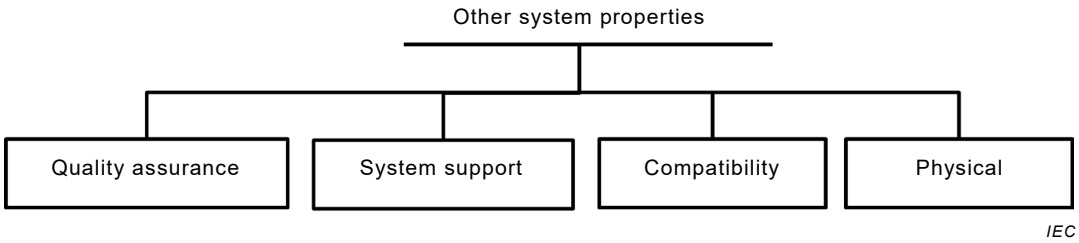

Figure 2 – Other system properties

OSP cannot be assessed directly and cannot be described by a single property. OSP can only be determined by analysis and testing of each of its properties individually.

The ability to list characteristics under OSP allows elaboration of these properties, if so required.

4.1.2 Quality assurance

BCSs are in practice developed, designed, engineered and configured using modules and elements, which can be of a single manufacturer, or be obtained from multiple parties.

Assuming the system properties as described in IEC 61069, the BCS is expected to be able to carry out its required tasks.

This capability is expected throughout the BCS' entire life cycle.

It is critical that methods are utilized in creating the system to ensure its overall quality.

As such, a robust quality assurance program is expected to be utilized to create and maintain the BCS throughout its entire life cycle.

Given that multiple parties can be involved in the creation of a BCS, the one or those multiple quality assurance program(s) shall be evaluated.

Guidance on the points that should be addressed in a quality assurance manual is given in the ISO 9000 series on quality management and in quality assurance standards, ISO 9001 and Annex B. Guidance on product reliability can be found in IEC 60300-2.

Software can be an integral part of BCS.

NOTE Guidance on the activities involving software is given in ISO/IEC 12207 and ISO/IEC 9126.

Particular attention should be paid to the operation of the document change control system to guarantee consistency between all versions of the hardware, software, and the system supporting documentation.

It is crucial that the overall quality assurance system includes specific measures to integrate the change control systems of the different manufacturers responsible for the correct working of the system throughout its life cycle.

4.1.3 System support

4.1.3.1 General

System support is required throughout all phases of the life cycle of a BCS.

The objectives of system support are to increase the user's confidence in the system, to ensure that the system is taken care of and to ensure that it provides the quality of achievement of which the system is capable.

For each of the phases in the system life cycle the following system support aspects are of importance:

– technical services;
– maintenance;
– documentation;
– training.

Circumstances can dictate how and by whom the system support is to be provided.

4.1.3.2 Technical services

The technical services can include:

– information services, for example specifications, updates, new products or concepts, application guidelines;
– design and engineering services;
– commissioning services, for example installation, check-out, start-up, etc.

The importance of these technical services will vary from one system life cycle phase to another.

4.1.3.3 Maintenance services

Maintenance services can include:

– field maintenance (e.g. software upgrade, firmware upgrade, hardware upgrade),
– remote maintenance (e.g. diagnostics, monitoring, software repair/upgrade),
– product obsolescence,
– spare parts, etc.

The importance of these maintenance services will vary from one system life cycle phase to another.

4.1.3.4 Documentation

Documentation can include:

– specifications, for example functional specifications, interface specifications, performance specifications;
– reliability specifications;
– instructions, for example installation instructions, operation instructions, maintenance instructions;

– guides, for example application notes;
– descriptions, for example a detailed account on how the total system performs its tasks, etc.

The documentation can be provided via different media, e.g. paper, disks, and network. The level of details required and the method used to present data depends upon the needs of the different groups of readers using the system in its various life cycle phases.

The SRD may also include specific requirements for electronic documentation formats, and system database formats. Compliance with those requirements then forms part of the overall assessment.

IEC 60300-3-10 provides guidance on maintenance support.

The IEC 61082 gives general information on documentation used in electrotechnology.

The IEC 61346 provides rules and guidance for the unambiguous reference designations for objects in any system for the purpose of correlating information about an object among different kinds of documents and the products implementing the system.

IEC 61506 gives information on documentation of application software.

4.1.3.5 Training

Specific training is important for all persons who are required to perform tasks to fulfil the mission to enable them to efficiently use the system, as indicated in IEC 61069-6:2016, 4.1.

The objective of training is to ensure that personnel have the necessary knowledge and skill to fulfil their task as part of the whole system mission. To be effective, training should meet both the organizational and individual needs.

Training programs should cover all skills and knowledge necessary to fulfil the tasks to be accomplished at each phase of the life cycle.

Guidance on the different aspects is given in Annex D.

The skill and knowledge requirements should at least cover:

– installation;
– configuration;
– correctness verification;
– operation;
– maintenance of the system.

Training can be provided through, for example:

– tutor training: conducted by the trainer;
– self training: conducted by the trainee;
– on-the-job training: dictated by the task(s).

These training methods can be combined with, for example, training simulators or automated tutorials.

4.1.4 Compatibility

Compatibility is a system property which supports the interaction within the system (internal compatibility) and the system interaction with external systems (external compatibility).

Compatibility is provided through the use of defined interfaces designed following strict rules and protocols. These are laid down in, for example:

– international and national standards;
– *de facto* standards, for example TCP/IP, or other widely used industrial standards; and
– proprietary standards (these can be published or unpublished), etc.

Compatibility provides:

– exchange of elements and modules of different suppliers;
– interoperability between different systems;
– support of migration path as technology advances.

NOTE Although compatibility is provided, it can however require additional steps to be taken to provide the required support, for example adaptation to a new operating system.

Compatibility can exist at different levels in the system hierarchy or area, such as:

– communication links;
– between software modules;
– between hardware components;
– at the man-machine interface;
– at the system electronic documentation format and database formats.

This can cover compatibility of simple hardware plugs up to total systems.

4.1.5 Physical properties

The physical properties of a system should be considered in relation to the constraints which are imposed by the circumstances of the application. The physical properties to be considered include:

– weight;
– size (and access space required for maintenance);
– vibration;
– power consumption (for example air, hydraulic and/or electricity supply);
– heat dissipation;
– emissions (for example light, noise, UV, IR or any other electromagnetic radiation).

Some of these properties can also have system safety implications, which are dealt with in IEC 61069-7.

4.2 Factors influencing OSP

The OSP of a system can be affected by the influencing factors listed in IEC 61069-1:2016, 5.3.

For each of the properties listed in 4.1, the primary influencing factors are as follows:

– No additional items for this property.

5 Assessment method

5.1 General

The assessment shall follow the method laid down in IEC 61069-2:2016, Clause 5.

5.2 Defining the objective of the assessment

Defining the objective of the assessment shall follow the method as laid down IEC 61069-2:2016, 5.2.

5.3 Design and layout of the assessment

Design and layout of the assessment shall follow the method as laid down in IEC 61069-2:2016, 5.3.

Defining the scope of assessment shall follow the method laid down in IEC 61069-2:2016, 5.3.1.

Collation of documented information shall be conducted in accordance with IEC 61069-2:2016, 5.3.3.

The statements compiled in accordance with IEC 61069-2:2016, 5.3.3 should include the following in addition to the items listed in IEC 61069-2:2016, 5.3.3:

– No additional items for this property.

Documenting collated information shall follow the method in IEC 61069-2:2016, 5.3.4.

Selecting assessment items shall follow IEC 61069-2:2016, 5.3.5.

Assessment specification should be developed in accordance with IEC 61069-2:2016, 5.3.6.

Comparison of the SRD and the SSD shall follow IEC 61069-2:2016, 5.3.

NOTE 1 A checklist of SRD for system dependability is provided in Annex A.

NOTE 2 A checklist of SSD for system dependability is provided in Annex B.

5.4 Planning the assessment program

Planning the assessment program shall follow the method as laid down in IEC 61069-2:2016, 5.4.

Assessment activities shall be developed in accordance with IEC 61069-2:2016, 5.4.2.

The final assessment program should specify points specified in IEC 61069-2:2016, 5.4.3.

5.5 Execution of the assessment

The execution of the assessment should be in accordance with IEC 61069-2:2016, 5.5.

5.6 Reporting of the assessment

The reporting of the assessment shall be in accordance with IEC 61069-2:2016, 5.6.

The report shall include information specified in IEC 61069-2:2016, 5.6. Additionally, the assessment report should address the following points:

– No additional items are noted.

6 Evaluation techniques

6.1 General

Within this standard, several evaluation techniques are suggested. Other methods may be applied but, in all cases, the assessment report should provide references to documents describing the techniques used.

Those evaluation techniques are categorized as described in IEC 61069-2:2016, Clause 6.

Factors influencing OSP of the system as per 4.2 shall be taken into account.

The techniques given in 6.2, 6.3 and 6.4 are recommended to assess OSP.

NOTE An example of a list of assessment items is provided in Annex C.

6.2 Analytical evaluation techniques

6.2.1 Evaluation of quality assurance

The evaluation of quality assurance (QA) can be achieved analytically by the execution of a quality audit.

A quality audit basically checks:

– the completeness of the quality assurance manual;
– the measures taken to ensure quality;
– the results of these measures, noted during the life cycle of the system;
– existence of an agreement between the supplier and user on the quality assurance system to be used.

ISO 19011 gives guidance on the execution of audits, gives the criteria of quality auditors and gives guidance on the management of audits. Important properties are:

– the existence of a certified QA system of the supplier;
– the assignment of a quality manager for the evaluated system, etc.

Annex E gives an example of the system properties to be taken into account when assessing the quality assurance of a BCS.

6.2.2 Evaluation of systems support

The evaluation of system support can be achieved analytically by direct comparison of the SRD and SSD in accordance with Clause 5.

Especially for system support, increased confidence can be obtained through former experiences with the supplier concerning similar activities.

6.2.3 Evaluation of compatibility

The evaluation of compatibility can be achieved analytically by regarding the internal and external interfaces as laid down in 4.1.4.

It is recommended that all internal and external interfaces should be identified and assigned to the level of element, module, device and system, including any documentation or data format compliance requirements, and to list all the standards used.

As an indication of the level of compatibility the applied standards can usually be ranked in descending order as follows:

– international and national standards;
– *de facto* standards;
– proprietary standards, etc.

However, other special considerations may modify the ranking. In some cases, a lower level of standardization is preferred, for example a proprietary standard before an international standard when the system is required to interface to an existing system. Moreover, different interfaces can have varying importance to the mission or the future system environment.

A matrix, as shown in Annex F, can be established to assess compatibility.

Each cell of the matrix shows a combination an interface rank and the standard used. This analysis can be supported by empirical tests, from simple plug in checks up to comprehensive, combined hardware and software tests.

6.2.4 Evaluation of physical properties

The evaluation of physical properties can be achieved analytically by direct comparison of the SRD and SSD in accordance with Clause 5.

Most of the physical properties will not be of major importance, unless they exceed a limit that is set by the customer’s environment or by international or national standards.

Some of the properties might require a ranking in accordance with a basic rule such as "the lower the better".

The analysis can be performed by listing the values of the physical properties from the system specification document and attaching a ranking to each of the values, to obtain properties to be evaluated.

6.3 Empirical evaluation techniques

6.3.1 Evaluation of systems support

For the system support items documentation and training, this analysis may be supported by empirical tests, by taking some representative samples.

6.3.2 Evaluation of compatibility

A matrix, as shown in Annex F, can be established to assess compatibility.

Each cell of the matrix shows a combination an interface rank and the standard used. This analysis can be supported by empirical tests, from simple plug in checks up to comprehensive, combined hardware and software tests.

6.4 Additional topics for evaluation techniques

– No additional items are noted.

Annex A
(informative)

Checklist and/or example of SRD for system functionality

A.1 SRD information

The system requirements document should be reviewed to check for all remaining requirements, beyond those addressed in IEC 61069-3 to IEC 61069-7, which by nature are not operational.

The effectiveness of the assessment of OSP is dependent upon the comprehensiveness of the requirement statements concerning these properties.

Particular attention should be paid to requirements which are related to the mission as a whole.

A.2 System support

For each of these aspects the system requirements document should specify:

– what system support is required;
– when it is required (e.g. during which phase);
– where it is required (e.g. at the site of the manufacturer and/or the user);
– the depth and frequency of feedback reporting.
– requirements for electronic documentation formats, and system database formats.

A.3 Quality assurance

For each of these aspects the system requirements document should specify:

– the quality assurance system to be used
– if an agreement between the supplier and user on the quality assurance system to be used is required

Annex B
(informative)

Check list and/or example of SSD for system functionality

B.1 SSD information

The system specification document should be reviewed to check that the properties given in the SRD are listed as described in IEC 61069-2:2016, Annex B.

B.2 Check points for other aspects

No general items.

Annex C
(informative)

Assessment of non-task-related system properties, sample system specification information from IEC TS 62603-1

C.1 Overview

Annex C provides some examples about Influencing factors related to this standard which were extracted from IEC TS 62603-1.

The classifications of the values of properties described in this document are only examples.

C.2 Non-task-related system properties

C.2.1 Technical and commercial support

The technical and commercial support provided by the manufacturer is important for the whole life-cycle of the BCS. The aspects described in C.2.2 to C.2.5 are to be either considered or specified.

C.2.2 Training of the personnel

The training of the personnel is intended for creating the needed skills for the user personnel on the new or updated BCS. The relevant objectives of the training should be documented and considered in the content (see also Annex D).

The training is identified by the following characteristics:

a) required level of training, according the function of the personnel (e.g. operation, maintenance, engineering, etc.);
b) number of trainers (people and hours needed for the training);
c) number of people to be trained;
d) place of the training:
    1) on the user’s system after or during the commissioning and start-up;
    2) on the manufacturer facilities on the user system, even if in a demo layout;
    3) on the manufacturer facilities using a demo unit, different from the real system that will be installed in the user’s plant.

C.2.3 Technical support for operation

The user should define the type of support he needs after the commissioning of the system.

The type of support includes the following aspects:

a) Engineering: any activity devoted to the modification of the system, both in terms of hardware and software configuration, such as design modification, configuration changes, adding new I/O points, etc.
b) Service: type of support guaranteed by the manufacturer when a failure or malfunction of the system appears. It should be identified by a SLA (Service Level Agreement), which is a part of a service contract and it is sometimes used to refer to the contracted delivery time or performance. The user should specify some minimum levels of intervention that should be guaranteed, e.g. time to answer to a call, time for intervention, etc.

c) Spare parts: the required amount of hardware spare parts and the time interval, in years, during which the spare parts of the system are available should be identified for the main parts of the BCS.

d) Support: the type of guaranteed support should be required or declared according to the type of failure or malfunction:

   1) on-site,

   2) on-line,

   3) daytime or 24/7.

C.2.4 Warranty

The warranty begins after the final acceptance by the customer, including the availability period if foreseen by the contract.

The availability period is the period, expressed in hours of functioning, during which the manufacturer declares that the system should not experience failures. If any failure or malfunction occurs during the availability period, the manufacturer has to restore the system to full operation within a contractual amount of time, e.g. one hour, otherwise the counter of availability period is reset.

The warranty is expressed in terms of years of support, both for hardware and software failures or malfunctions.

The warranty should be specified with an agreed SLA.

C.2.5 References of the vendor

C.2.5.1 General

The vendor should provide additional information regarding the references of the company. These items of information are useful for knowing the background, the core competencies and the experience of the company in similar applications. The vendor should declare limitations in supplying services or products in some countries (if applicable).

C.2.5.2 Core competencies

The user should identify which are the core competencies needed by the vendor in order to assess the requirements for the desired application.

C.2.5.3 Application experience

The company should provide a description of its own application experience that are important for defining the skill of the company in such an area.

C.2.5.4 References for similar applications

The user should request a list of similar applications, already successfully done by the manufacturer.

The number of required references is set by the user.

The reference list should report:

– the name of the company that bought the application;

– the reference person(s) to contact;

– the year of installation;

– the type of system provided.

C.3 System support

C.3.1 Automatic documentation

The BCS automatically generates the documentation after the configuration phase. Documents may include:

– system architecture,
– configuration parameters,
– list of material,
– application software,
– wiring table for terminations,
– cables and plugs configuration,

C.3.2 On-line documentation

The documentation, including the technical documentation on the components of the BCS, are in file formats and are available to be browsed by a computer. It is possible to access them directly from a PC.

Annex D
(informative)

Subjects to be considered on type of training required for the mission

D.1 General

As described in IEC 61069-1, the analysis of the intended mission will result in a number of tasks to be performed to fulfil that mission.

Some of these tasks can be automated by a suitable BCS.

Such a system will ease the task of personnel. However, the means of monitoring and manipulating the equipment under the control of that system will change, and in addition there will be the task of observing the correct operation of this system.

The new group of tasks to be performed by a particular person, or class of persons, will therefore alter and the necessary know-how and practical skills will need to be acquired, together with the right attitude.

A number of factors which influence the ability of a person to perform tasks correctly can be grouped as follows:

a) enabling factors, such as
   - knowledge;
   - attitude;
b) skills, such as
   - technical skill;
   - decision making;
   - communication.

Depending on the group of tasks to be performed and the life cycle phase in which they have to be executed, these factors are always present, although their depth and importance may vary. They should be dealt with within each training scheme.

D.2 Enabling factors

D.2.1 General

The enabling factors provide the necessary background to perform the tasks required. They enable the person to consider the best way in which to accomplish the task.

D.2.2 Knowledge

"Knowledge" is the total collection of facts and relations acquired through information, study and experience.

The range of knowledge should include language (spoken and written), mathematics, relevant technology, measurement and control techniques, economics, administration methods, etc.

Each person should know as much as possible about his work before being engaged in a training program to learn what is relevant to do the job.

Relevant knowledge or core knowledge defines what each person, appointed for a particular task, should be familiar with in order to do that task.

Not all relevant knowledge is of equal importance, however, and it can be divided into two categories:

– required knowledge;
– helpful to knowledge.

Although it is generally a good thing to know as much as possible, adding facts beyond the "required know" level should only be applied when the learner actively wishes to know. On the other hand, core knowledge should not be restricted to a bare minimum. Core knowledge should be at a level which gives the employee the safe and comfortable feeling that he masters his task(s).

D.2.3 Attitude

"Attitude" is the collection of internal forces which determine a person's behaviour. It is difficult to define such forces, and likewise it is difficult to determine explicitly a person's attitude. Yet attitude remains important.

Attitudes are acquired during early childhood.

Attitudes can change, but this is a very slow process and one that is affected mainly by experience.

If certain attitudes are essential for accomplishing a task, the work environment should be designed to actively motivate the promotion of such attitudes.

D.3 Skills

D.3.1 General

"Skills" are the abilities to bring knowledge into practice.

Skills can be divided in three categories:

– technical skills;
– decision making;
– communication.

D.3.2 Technical skills

The technical skills to be acquired are those which are

– equipment driven and connected with the use of the equipment found at the lowest physical level; these include the use of manual tools, keyboards, screens, etc.;
– driven by rules, so that the operator is able to recognize information given to him by the system and associates this with the required action, as guided by methods to be followed.

Training should include handling of safety actions, auto to manual switching, etc.

Some very obvious skills should be included in the training scheme, such as basic skills e.g. the use of pencil and paper. These should be addressed, since during actual production, people might be employed who do not necessarily master these skills, but who possess valuable practical experience, indispensable for other aspects of the tasks.

D.3.3 Skill to make decisions

In order to make an effective decision in a certain situation, it is important to be able to have and/or bring facts to hand related to the problem, apply these facts to the situation, draw a conclusion and act accordingly.

This requires the operator to use his basic know-how of the process, to apply this to identify the information obtained from the system, and to devise a strategy to overcome the situation using known rules. It will often be necessary to review the facts in order to come to an acceptable interpretation.

Simulators should be used in the training schemes, where possible.

D.3.4 Skill to communicate effectively

Communication skills – spoken or written – are necessary for informing, persuading, explaining, etc., or when somebody is explaining, listening, making something clear, demonstrating, asking questions, inviting comments, giving feedback, etc.

D.4 Overview of training items

Table D.1 lists, in matrix form, different items to be included in a training program.

For each of the items, the level of knowledge and skill for a given task should be indicated.

The matrix is not exhaustive, and should be supplemented with the particular needs of the mission and tasks for which the training program is conceived.

Each of the cells in the matrix should be further expanded to give details of the course or training contents of a particular learning item.

Table D.1 – Training items

Items	Depth of know-how		Depth of skill	
	Required knowledge	Helpful knowledge	Required knowledge	Helpful knowledge
General subjects:				
– Languages:				
* Mother tongue				
* English				
* Software languages				
– Mathematics:				
* Calculations				
* Basic functions				
* Boolean algebra				
* Matrix algebra				
* Statistics				
* Modelling				
– Technology:				
* Physics				
* Chemistry				

Items	Depth of know-how		Depth of skill	
	Required knowledge	**Helpful knowledge**	**Required knowledge**	**Helpful knowledge**
* Electronics				
* Mechanical				
* Materials				
– Administrative:				
* Use of forms				
* Writing reports				
* Interpreting data				
* Making a balance sheet				
– Social:				
* Communicating				
* Team membership				
* Effective listening				
* Oral reporting				
* Giving a presentation				
Specific subjects:				
– Equipment:				
* Depending on the application				
* Valves				
* Motors				
* Pumps				
* Conveyors				
* Heat exchangers				
* Furnaces				
* Measuring instruments				
* Control modules				
* Control systems				
* Diagnostic tools				
– Engineering:				
* Measurement techniques				
* Control techniques				
* Software engineering				
* Application engineering				
* Electrical engineering				
* Mechanical engineering				
* Project handling				
* Maintenance management				
* Power engineering				
– Unit operations:				
* Combustion				
* Power generation				
* Water treating				

Items	Depth of know-how		Depth of skill	
	Required knowledge	**Helpful knowledge**	**Required knowledge**	**Helpful knowledge**
* Distillation				
* Catalytic processing				
* Drying				
* Filtration				
* Cooling/freezing				
* Scheduling				
* Distribution				
* Energy conservation				
* Environmental protection				

Annex E
(informative)

Evaluation indicators to assess quality assurance

E.1 Company

Tables E.1 to E.20 provide guides for evaluating and collecting information to evaluated and assess quality assurance capabilities.

Table E.1 – Company profile

Evaluation items	Target requirements for 100 % conformance
Economic aspects	The company is sound.
Product range/process range	The range of products and processes covers the largest possible proportion of the customers' requirements (as stated in SRD) so that as many products as possible can be obtained from a small number of suppliers.
Locations	The suppliers' locations provide optimum transport logistics, communications and safety.
Market position	The supplier is well established in the market concerned (market share) and has a good reputation.
Innovation rate/Innovation potential	The supplier has the necessary potential (resources) to fulfil the requirements in terms of innovations.

Table E.2 – Management

Evaluation items	Target requirements for 100 % conformance
Stability	The management shows permanence or, in the event of changes, the necessary continuity so that the customer can depend on the supplier's long-term predictability.
Competence	Through its conduct, the management shows that it is competent to fulfil the customer's requirements.
Customer orientation	Through continuous contact with the customer, the management demonstrates its customer-oriented thinking. The measures agreed during visits to and in meetings with the customer are implemented quickly and effectively.

Table E.3 – Quality management system (QM)

Evaluation items	Target requirements for 100 % conformance
Certification	The supplier has a QM system certified in accordance with ISO 9000 or a comparable standard.
Audit results	The results of internal quality audits and the results of other customers reveal no serious discrepancies.

Table E.4 – Co-operation and service (overall assessment)

Evaluation items	Target requirements for 100 % conformance
Partnership	The supplier has a quality policy aimed at partnership with his customers. Partnership is practised in all respects at the interfaces between customer and supplier.
Flexibility	The supplier's organization is geared to flexibility in terms of co-operation with the customer so that the customer's wishes are responded to, examined in an appropriate manner and implemented accordingly. This is also demonstrated in the course of day-to-day co-operation with the customer.
Reliability	The supplier shows through his conduct that he is a reliable partner.
Quality assurance agreement	The supplier is prepared in principle to make quality assurance agreements with the customer.
Accessibility	At the interfaces, the supplier offers the necessary technical, organizational and human resources in order to permit optimum communication.

E.2 Technologies

Table E.5 – Product strategy

Evaluation items	Target requirements for 100 % conformance
Orientation towards standards	As far as it is possible and necessary, the supplier is oriented towards existing standards.
Orientation towards customer's needs	The product strategy is geared to the needs of the customer with the facility for responding swiftly to changing needs.
Systems/modules	The supplier is prepared and has the capability to supply modules/systems in addition to products of his own manufacture.

Table E.6 – Production

Evaluation items	Target requirements for 100 % conformance
Deployment of technology	The technology deployed corresponds to the state of the art.
Technological competence	The supplier is fully competent in the use of the technologies deployed.

Table E.7 – Development

Evaluation items	Target requirements for 100 % conformance
Development time	The development time (time up until marketing) is the shortest by comparison with the supplier's competitors.
Samples/prototypes	Samples/prototypes are always supplied by the agreed date. The first samples/prototypes comply with the specified requirements.
Qualification (methods)	The supplier is able to carry out all necessary tests, so that there is no need for complete quality testing at the customer's site.
Market maturity	The principal features of the first samples/prototypes (process capability etc.) already show that the series-manufactured products will fully comply with the customer's requirements.

Table E.8 – Co-operation

Evaluation items	Target requirements for 100 % conformance
Technical support	The supplier can provide support for the customer's development staff in all aspects of development and thereby play a key role as a valuable partner of the customer.
Information policy	The flow of information from the supplier is comprehensive and allows the customer's development staff to take into account all aspects of the new product as seen from the supplier's viewpoint.
Interfaces	The supplier offers sufficient direct contacts to ensure that the information flow is not distorted and/or obstructed by unnecessary detours.
Documentation	The documentation on samples/prototypes is comprehensive and does not give rise to subsequent queries.

E.3 Processes

Table E.9 – Process documentation

Evaluation items	Target requirements for 100 % conformance
Methods	All key processes (operational and production processes) are documented in a suitable form (methods).
Test points	All processes feature suitable test points so that it can be verified that the supplier has a complete command of the processes

Table E.10 – Process control

Evaluation items	Target requirements for 100 % conformance
Process conformance	The process conformance of the key processes is proven and satisfies the requirements.
Process changes (frequency)	The frequency of the changes is in accordance with the need to increase quality, to reduce costs and to assure supplies to the customer.

Table E.11 – Environmental compatibility

Evaluation items	Target requirements for 100 % conformance
Consumption of resources (per product manufactured)	The supplier monitors, documents and provides information on the consumption of resources. By comparison with the supplier's competitors, the consumption of resources is optimal.
Use of hazardous substances	The use of hazardous substances in the manufacturing process is documented, and efforts are made to keep the use of hazardous substances to an absolute minimum.
Environmental pollution	Environmental pollution arising from the manufacture, application and waste disposal of the products is documented and continuously reduced.
Risk potential	The risk potential arising from the product is already taken into account at the development stage and the risks are minimized. Where necessary, suitable labelling is used to draw the attention of the consumer to the remaining risk.

Table E.12 – Co-operation

Evaluation items	Target requirements for 100 % conformance
Notification of change	Important product and process changes are only implemented after prior consultation with the customer and are notified in good time prior to their planned introduction so that the customer can examine the effects on his current production and, where necessary, obtain the required approval from his customers.
Reports on process conformance	The supplier reports at regular, agreed intervals on the process conformance of the critical product and process parameters.

E.4 Products

Table E.13 – Delivery quality

Evaluation items	Target requirements for 100 % conformance
Failure rate	The failure rate ($\times 10^{-6}$) is lower/better than the agreed quality target for all products supplied.
Reject rate (technical)	The reject rate in percentage of deliveries is below the agreed target value.
Production failure rate (customer)	The number of production failures ($\times 10^{-6}$) (failures which occur in subsequent processing steps) is below the agreed target value.
Packaging, labelling	The complaints regarding deficiencies in packaging and labeling ($\times 10^{-6}$) based on the process steps is below the agreed target value. The packaging is practical, provides adequate protection for the products and is limited to what is necessary. The labelling contains all essential information, is clearly legible and is provided with a bar-code.

Table E.14 – Reliability

Evaluation items	Target requirements for 100 % conformance
Failure rate in the field	The failure rate in the field (failures in the course of operation by the end user) is below the agreed target value ($\times 10^{-6}$).
Results of reliability tests	The number of failures in reliability tests carried out by the supplier and the customer is less than the agreed values.

Table E.15 – Processing of complaints

Evaluation items	Target requirements for 100 % conformance
Failure analysis reports	In terms of both form and content, the reports meet the requirements. They contain details of corrective action required to prevent the recurrence of the failure.
Processing time	The processing time for the failure analysis report, covering – the initial acknowledgement, – the concluding assessment, – proposed corrective action, satisfies the requirements.
Effectiveness of corrective actions	The corrective action proposed in failure analysis reports is successful. Recurrent failures do not occur.

Table E.16 – Co-operation

Evaluation items	Target requirements for 100 % conformance
Interfaces	The interfaces and methods for the exchange of information on products are clearly defined.
Information	The information provided on the products is adequate and satisfactory.
Early warning system (technical)	The supplier operates an early warning system which gives the customer early notification of the occurrence of problems in the supplier's production.
Mutual improvement programs	On his own initiative, the supplier takes steps to improve the products he supplies.
Notification of changes	Changes are notified promptly and in detail so that no queries are necessary.

E.5 Deliveries

Table E.17 – Delivery logistics

Evaluation items	Target requirements for 100 % conformance
Ability to deliver	The supplier's ability to deliver is assured even in the event of changes in the requirements due to increased demand. For this purpose, regular discussions of projected quantitative requirements take place between the supplier and the customer. The supplier is proactive in seeking this dialogue.
Reliability of deliveries	The reliability of deliveries, expressed in percentage of deliveries which comply with the agreed delivery date, is above the target value.
Reject rate (logistical)	The reject rate of the deliveries in percentage due to logistical errors (incorrect deliveries, incorrect delivery date, etc.) is below the target value.
Contingency stocks	The supplier maintains contingency stocks to assure deliveries in the event of short-term production breakdowns.
JIT/STS concepts	The supplier actively offers contracts for Just In Time/Ship To Stock deliveries.
Early warning system (logistical)	The logistics of the supplier incorporate an early warning system to inform the customer promptly of delivery delays.

Table E.18 – Transport systems

Evaluation items	Target requirements for 100 % conformance
Transport, packaging	The method of transport and form of packaging are selected so as to reliably prevent damage to the products in transit.
Labelling	The labelling conforms to the customer’s requirements. Special labelling requirements are taken into account.
Re-use/waste disposal	The form of packaging (material, construction, etc.) permits re-use or, alternatively, the orderly disposal of waste through the use of suitable materials, appropriately marked, which enable a separation.
Documents accompanying goods	The documents which accompany the goods contain all necessary information, clearly presented.

Table E.19 – Cost management

Evaluation items	Target requirements for 100 % conformance
Sales conditions/terms of payment	The supplier accepts the customer's purchasing conditions and terms of payment or, alternatively, observes normal market practice.
Pricing practice, discipline	The supplier gives reliable, long-term price indications and is prepared to sign long-term delivery agreements with firm prices.
Cost transparency	The costs of the product are broken down clearly so that the main cost items (materials, production costs, packaging costs, etc.) can be identified and the potential for cost reductions recognized by both parties.

Table E.20 – Co-operation

Evaluation items	Target requirements for 100 % conformance
Data exchange	The supplier has the technical facilities required in order to be able to process cost-effectively the exchange of data (purchase orders, complaints, data sheets, etc.) via EDI (Electronic Data Interchange).
Processing of enquiries and orders	The processing time for orders and enquiries conforms to the agreed time scales.
Response time/flexibility	The response time and flexibility meet the agreed requirements.
Joint cost reduction programs	Together, the supplier and the customer analyse the costs at regular intervals to identify possibilities of cost reductions and initiate appropriate actions.
Discontinuation of products	The discontinuation of products is carried out within a suitable time scale to allow the customer to develop alternatives without diminishing his ability to deliver.

NOTE With the permission of the publisher, Annex B has been taken from the publication ZVEI FV 23: *Supplier Evaluation System*.

Annex F
(informative)

Evaluation matrix to assess compatibility

Table F.1 shows an example of the evaluation matrix.

Table F.1 – Evaluation matrix to assess compatibility

Type of interface	Standard applied	Ranking	Conformance to SRD	Acceptance Yes/No
Elements: – input cards – output cards –..... – connecting cables	 Proprietary Proprietary IEC			
Modules:				
Subsystem:				
Communication:	IEC			
Task: – control – logging	 IEC			
Application: – software	 ISO			

Bibliography

[1] IEC 60300-2, *Dependability management – Part 2: Dependability programme elements and tasks*[1]

[2] IEC 60300-3-10, *Dependability management – Part 3-10: Application guide – Maintainability*

[3] IEC 61069-3:2016, *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 3: Assessment of system functionality*

[4] IEC 61069-4:2016, *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 4: Assessment of system performance*

[5] IEC 61069-5:2016, *Industrial-process measurement, control and automation– Evaluation of system properties for the purpose of system assessment – Part 5: Assessment of system dependability*

[6] IEC 61069-6:2016, *Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 6: Assessment of system operability*

[7] IEC 61069-7:2016, *Industrial process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 7: Assessment of system safety*

[8] IEC 61082-1, *Preparation of documents used in electrotechnology – Part 1: Rules*

[9] IEC 61082-2, *Preparation of documents used in electrotechnology – Part 2: Function-oriented diagrams*[2]

[10] IEC 61082-3, *Preparation of documents used in electrotechnology – Part 3: Connection diagrams, tables and lists*[3]

[11] IEC 61082-4, *Preparation of documents used in electrotechnology – Part 4: Location and installation documents*[4]

[12] IEC 61187, *Electrical and electronic measuring equipment – Documentation*

[13] IEC 61346-1, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designation – Part 1: Basic rules*[5]

---

1 This publication was withdrawn.

2 This publication was withdrawn and replaced by IEC 61082-1:2006.

3 This publication was withdrawn and replaced by IEC 61082-1:2006.

4 This publication was withdrawn and replaced by IEC 61082-1:2006.

5 This publication was withdrawn and replaced by IEC 81346-1:2009.

[14] IEC 61346-2, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 2: Classification of objects and codes for classes*[6]

[15] IEC 61346-4, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designation – Part 4: Discussion of concepts*[7]

[16] IEC 61506:1997, *Industrial-process measurement and control – Documentation of application software*

[17] IEC 61355 (all parts), *Classification and designation of documents for plants, systems and equipment*

[18] IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

[19] ISO/IEC/IEEE 15288, *Systems and software engineering – System life cycle processes*

[20] IEC TS 62603-1, *Industrial process control systems – Guideline for evaluating process control systems – Part 1: Specifications*

[21] ISO 19011, *Guidelines for quality and/or environmental management systems auditing*

[22] ISO/IEC 25000, *Software engineering – Software product Quality Requirements and Evaluation (SQuaRE) – Guide to SQuaRE*

[23] FV 23, *Supplier evaluation system*, ZVEI, Nürnberg

[24] Saaty, Thomas, *The analytical hierarchy process*, McGraw-Hill, New York

[25] Kepner, C & Tregoe, B, *The rational manager*, McGraw-Hill, New York

[26] Smith, M, Dennis, *Two views of "Total System"*, ISA paper ISBN 0-87664-701-8

[27] ISO 9000, *Quality management systems – Fundamentals and vocabulary*

[28] ISO 9001, *Quality management systems – Requirements*

[29] ISO/IEC 9126 (all parts), *Software engineering – Product quality*

[30] ISO/IEC 12207:1995, *Systems and software engineering – Software life cycle processes*

_____

6 This publication was withdrawn and replaced by IEC 81346-2:2009.

7 This publication was withdrawn.

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services
Tel: +44 345 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 345 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.