IEC 61069-8

Edition 2.0 2016-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Industrial-process measurement, control and automation – Evaluation of system properties for the purpose of system assessment – Part 8: Assessment of other system properties

Mesure, commande et automation dans les processus industriels – Appréciation des propriétés d'un système en vue de son évaluation – Partie 8: Évaluation des autres propriétés d'un système

IEC 61069-8:2016-06(en-fr)

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FOREWORD

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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- withdrawn,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.

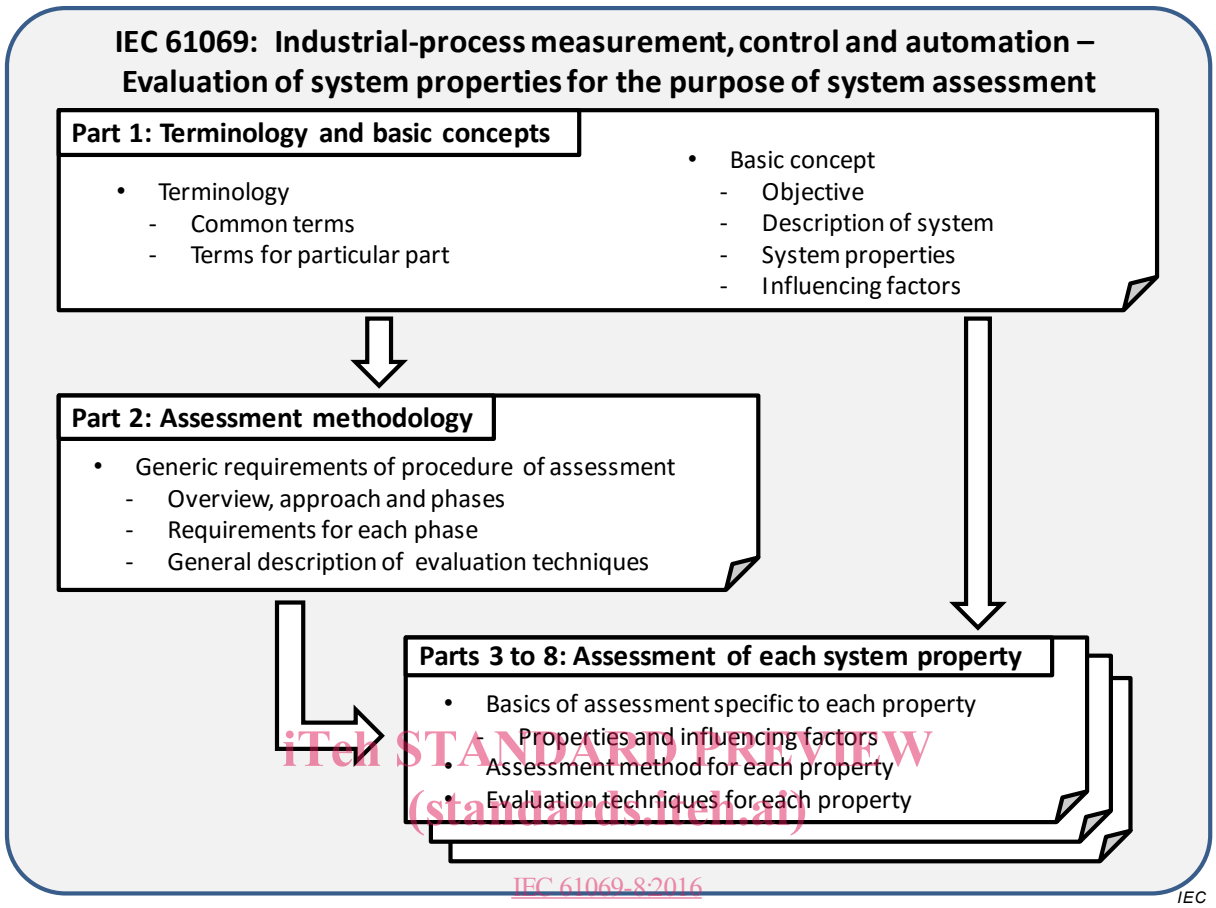

Figure 1 – General layout of IEC 61069

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.

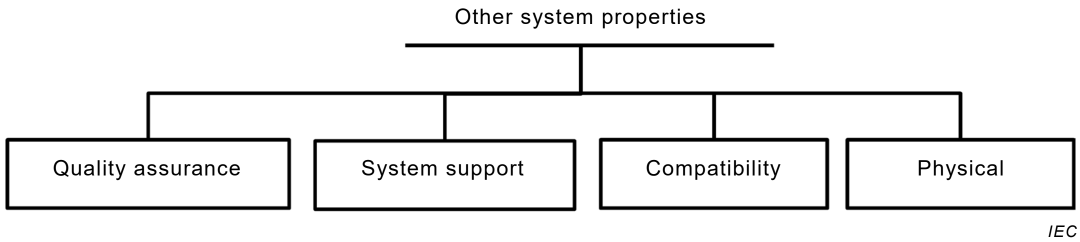

Figure 2 – Other system properties

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.