



SLOVENSKI STANDARD

SIST EN 60709:2010

01-september-2010

Jedrske elektrarne - Merilna in nadzorna oprema za zagotavljanje varnosti - Ločevanje (IEC 60709:2004)

Nuclear power plants - Instrumentation and control systems important to safety - Separation (IEC 60709:2004)

Kernkraftwerke - Leittechnische Systeme mit sicherheitstechnischer Bedeutung - Physikalische und elektrische Trennung (IEC 60709:2004)

Centrales nucléaires de puissance - Systèmes d'instrumentation et de contrôle commande importants pour la sûreté - Séparation (CEI 60709:2004)

<https://standards.iteh.ai/catalog/standards/sist/bcfd7eb-f41d-4acd-a5ee-25791fe59fd/sist-en-60709-2010>

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60709

May 2010

ICS 27.120.20

English version

**Nuclear power plants -
Instrumentation and control systems important to safety -
Separation
(IEC 60709:2004)**

Centrales nucléaires de puissance -
Systèmes d'instrumentation et de contrôle
commande importants pour la sûreté -
Séparation
(CEI 60709:2004)

Kernkraftwerke -
Leittechnische Systeme
mit sicherheitstechnischer Bedeutung -
Physikalische und elektrische Trennung
(IEC 60709:2004)

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This European Standard was approved by CENELEC on 2010-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of the International Standard IEC 60709:2004, prepared by SC 45A, Instrumentation and control of nuclear facilities, of IEC TC 45, Nuclear instrumentation, was submitted to the CENELEC formal vote for acceptance as a European Standard and was approved by CENELEC as EN 60709 on 2010-05-01.

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

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2011-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2013-05-01

Annex ZA has been added by CENELEC.

As stated in the nuclear safety Directive 2009/71/EURATOM, Chapter 1, Article 2, item 2, Member States are not prevented from taking more stringent safety measures in the subject-matter covered by the Directive, in compliance with Community law. In a similar manner, this European Standard does not prevent Member States from taking more stringent nuclear safety measures in the subject-matter covered by this European Standard.”

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Endorsement notice

The text of the International Standard IEC 60709:2004 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60332	Series	Tests on electric and optical fibre cables under fire conditions	EN 60332	Series
IEC 60964	-	Design for control rooms of nuclear power plants	-	-
IEC 61000	Series	Electromagnetic compatibility (EMC)	EN 61000	Series
IEC/TS 61000-6-5	-	Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for power station and substation environments	-	-
IEC 61226	-	Nuclear power plants - Instrumentation and control systems important to safety - Classification	-	-
IEC 61513	-	Nuclear power plants - Instrumentation and control for systems important to safety - General requirements for systems	-	-
IEC/TR 62096	-	Nuclear power plants - Instrumentation and control - Guidance for the decision on modernization	-	-
IAEA safety guide NS-G-1.3	-	Instrumentation and control systems important to safety in nuclear power plants	-	-

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**NORME
INTERNATIONALE
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STANDARD**

**CEI
IEC**

60709

Deuxième édition
Second edition
2004-11

**Centrales nucléaires de puissance –
Systèmes d'instrumentation et de
contrôle commande importants
pour la sûreté – Séparation**

iTeh STANDARD PREVIEW

**Nuclear power plants –
Instrumentation and control systems
important to safety – Separation**

<https://standards.iteh.ai/catalog/standards/sist/bcfd7eb-f41d-4acd-a5ee-25791fe59fd/sist-en-60709-2010>

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

NUCLEAR POWER PLANTS – INSTRUMENTATION AND CONTROL SYSTEMS IMPORTANT TO SAFETY – SEPARATION

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60709 has been prepared by subcommittee 45A: Instrumentation and control of nuclear facilities, of IEC technical committee 45: Nuclear instrumentation.

This second edition cancels and replaces the first edition published in 1981 and constitutes a technical revision. This revision of IEC 60709 is intended to accomplish the following:

- adjust the document format to follow current IEC/ISO directives on style of standards;
- expand to cover all systems important to safety, and separation between and within category A, B, C and un-categorised systems;
- align with the new revisions of IAEA documents (replacing D3 and D8) and broaden the scope to include other aspects of independence;
- provide references to relevant normative standards;

- cover new technologies that either present unique separation issues or provide new means of achieving independence;
- include provisions from IEC 60639 (which will be withdrawn as a standard) that are not adequately covered in IEC 61513 or that required further expansion, e.g. isolation, control/protection interaction, etc.;
- expand concepts of electromagnetic disturbance as a failure initiator with CCF potential and the use of separation as a means to minimise risk of interference;
- enhance requirements and guidance for areas of cable congestion, e.g. control room, cable spreading galleries, etc.;
- introduce the concept of “associated circuits” (from US practice) to deal with non-safety cables that are not separated from safety cables;
- provide guidance for the application of fire qualification standards (such as the IEC 60332 series) to cables important to safety. This includes the topics:
 - barriers as an alternative to separation,
 - cables themselves as potential barriers, and
 - similar concepts such as fibre optics as a barrier to EMI, armour as a barrier to physical damage, etc.;
- address the implications of low energy circuits, such as the possible use of analysis to reduce the minimum separation distance;
- review existing requirements, update terminology and definitions;
- provide guidance for the application of the standard to existing plants.

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

FDIS	Report on voting
45A/537/FDIS	45A/545/RVD

<https://standards.itec.ai/catalog/standards/sist/en-60709-2010/45a-537-fdis-45a-545-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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

Background, main issues and organization of the standard

I&C systems important to safety in nuclear power plants need to tolerate the effects of plant / equipment faults as well as internal and external hazards. Various techniques are available to increase the level of tolerability of I&C systems to such effects, including the provision of independent systems, subsystems and equipment. For claims to be made of independence between such systems and equipment, adequate separation must be provided and maintained. This standard provides technical requirements and recommendations for the implementation of separation in the design of I&C systems.

The object of this standard is as follows:

- in Clause 4, to identify a certain number of possible causes of failures and to lay down, taking these causes into consideration, a set of requirements to be followed when designing an I&C system important to safety in order to ensure that its purpose is fulfilled in the best possible way. These requirements apply to the I&C system as a whole. Clause 4 also presents guidance on separation when modernising I&C systems at existing nuclear power plants;
- in Clause 5, to establish design basis criteria for I&C systems important to safety that take the causes of failure identified in Clause 4 into consideration;
- in Clause 6, to give requirements to be fulfilled for cabling separation within an I&C system important to safety.

Situation of the current standard in the structure of the SC 45A standard series

IEC 60709 is a document of the second level, directly referenced by IEC 61513 in regard to physical and electrical separation being required between subsystems of different safety trains of I&C systems important to safety, and between I&C systems important to safety and those that are not important to safety.

IEC 61226 establishes the principles of categorization of I&C functions, systems and equipment according to their level of importance to safety. It then requires that adequate separation be provided between functions of different categories. IEC 61226 refers to IEC 60709 as the normative standard regarding requirements of separation.

For more details on the structure of the SC 45A standard series, see the last paragraph of this introduction.

Recommendations and limitations regarding the application of the Standard

IEC 60709 applies to I&C systems and equipment important to safety. It establishes requirements for physical and electrical separation as one means to provide independence between the functions performed in those systems and equipment. Other aspects of independence that may be required to address concerns of common cause failure are not included in this standard.

Additional requirements relating to availability and detailed requirements for the elimination of electrical interference are not given in this standard.