

Nuclear power plants — Instrumentation and control systems important to safety — Separation

ICS 27.120.20

National foreword

This British Standard is the UK implementation of EN 60709:2010. It is identical to IEC 60709:2004. It supersedes BS IEC 60709:2004, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee NCE/8, Reactor instrumentation.

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

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31 August 2010	This corrigendum renumbers BS IEC 60709:2004 as BS EN 60709:2010

**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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CENELEC

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

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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with the EN have to be withdrawn (dow) 2013-05-01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.”

Endorsement notice

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

CONTENTS

INTRODUCTION.....	4
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 General principles for separation within I&C systems important to safety.....	9
4.1 General	9
4.2 Design errors	10
4.3 I&C system failure events	10
4.3.1 Single random failure.....	10
4.3.2 Multiple failures from a single common cause	10
4.4 Plant failure events.....	11
4.4.1 Environmental conditions.....	11
4.4.2 Electromagnetic interference	11
4.4.3 Failure of plant systems, equipment or structures	11
4.4.4 Operator error	11
4.5 External failure events.....	11
4.5.1 Natural events	11
4.5.2 External man-made causes	12
4.6 Special operating conditions.....	12
4.7 Separation issues at existing plants	12
5 Design basis.....	13
5.1 Fire protection	13
5.2 Environmental conditions during and after accidents	13
5.3 Isolation devices	13
5.3.1 General	13
5.3.2 Isolation characteristics	14
5.3.3 Actuation priority	14
5.4 Independence from control systems	14
6 Requirements for cabling separation	16
6.1 General requirement	16
6.2 Separation.....	16
6.2.1 Separation of redundant cables inside the I&C system important to safety	16
6.2.2 Lesser separation distances	16
6.2.3 Associated circuits.....	17
6.2.4 Separation of system cables of different safety categories.....	18
6.2.5 Separation of signal cables from power cables	18
6.2.6 Separation of cables from tubes or pipes	18
6.2.7 General routing considerations	18
6.2.8 Control room cabinets, desks, panels and related cables.....	18
6.3 Thermal and physical protection	20
6.4 Fire protection	20
6.5 Identification.....	20
Annex ZA (normative) Normative references to international publications with their corresponding European publications.....	

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.

Description of the structure of the SC 45A standard series and relationships with other IEC documents and other bodies documents (IAEA, ISO)

The top level document of the SC 45A standard series is IEC 61513. It provides general requirements for instrumentation and control systems and equipment (I&C systems) that are used to perform functions important to safety in nuclear power plants (NPPs). IEC 61513 structures the SC 45A standard series.

IEC 61513 refers directly to other SC 45A standards for general topics related to categorization of functions and classification of systems, qualification, separation of systems, defence against common cause failure, software aspects of computer based systems, hardware aspects of computer based systems, and control room design. The standards referenced directly at this second level should be considered together with IEC 61513 as a consistent document set.

At a third level, SC 45A standards generally not directly referenced by IEC 61513 are standards related to specific equipment, technical methods or specific activities. Usually these documents, which make reference to second level documents for general topics, can be used on their own.

A fourth level extending the SC 45A standard series corresponds to the technical reports, which are not normative.

IEC 61513 has adopted a presentation format similar to the basic safety publication IEC 61508 with an overall safety life-cycle framework and a system life-cycle framework and provides an interpretation of the general requirements of IEC 61508-1, -2 and -4, for the nuclear application sector. Compliance with this standard will facilitate consistency with the requirements of IEC 61508 as they have been interpreted for the nuclear industry. In this framework IEC 60880 and IEC 62138 correspond to IEC 61508-3 for the nuclear application sector.

IEC 61513 refers to ISO as well as to IAEA 50-C-QA for topics related to quality assurance.

The SC 45A standards series consistently implements and details the principles and basic safety aspects provided in the IAEA Code on the safety of nuclear power plants and in the IAEA safety series, in particular the Requirements NS-R-1, "Safety of Nuclear Power Plants: Design" and the Safety Guide NS-G-1.3, "Instrumentation and control systems important to safety in Nuclear Power Plants". The terminology and definitions used by SC 45A standards are consistent with those used by the IAEA.

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