



SLOVENSKI STANDARD

SIST EN 61226:2010

01-september-2010

**Jedrske elektrarne - Merilna in nadzorna oprema za zagotavljanje varnosti -
Klasifikacija funkcij merilne in nadzorne opreme (IEC 61226:2009)**

Nuclear power plants - Instrumentation and control important to safety - Classification of instrumentation and control functions (IEC 61226:2009)

Kernkraftwerke - Leittechnische Systeme mit sicherheitstechnischer Bedeutung -
Kategorisierung leittechnischer Funktionen (IEC 61226:2009)

Centrales nucléaires de puissance - Instrumentation et contrôle-commande importants
pour la sûreté - Classification des fonctions d'instrumentation et de contrôle-commande
(CEI 61226:2009)

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61226

March 2010

ICS 27.120.20

English version

**Nuclear power plants -
Instrumentation and control important to safety -
Classification of instrumentation and control functions
(IEC 61226:2009)**

Centrales nucléaires de puissance -
Instrumentation et contrôle-commande
importants pour la sûreté -
Classification des fonctions
d'instrumentation
et de contrôle-commande
(CEI 61226:2009)

Kernkraftwerke -
Leittechnische Systeme
mit sicherheitstechnischer Bedeutung -
Kategorisierung leittechnischer
Funktionen
(IEC 61226:2009)

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This European Standard was approved by CENELEC on 2010-03-01. 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.

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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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of the International Standard IEC 61226:2009, 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 61226 on 2010-03-01.

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The following dates are proposed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2011-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-03-01

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 61226:2009 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 61508-1	NOTE	Harmonized as EN 61508-1.
IEC 61508-2	NOTE	Harmonized as EN 61508-2.
IEC 61508-3	NOTE	Harmonized as EN 61508-3.
IEC 61508-4	NOTE	Harmonized as EN 61508-4.

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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 60671	2007	Nuclear power plants - Instrumentation and control systems important to safety - Surveillance testing	-	-
IEC 60709	-	Nuclear power plants - Instrumentation and control systems important to safety - Separation	-	-
IEC 60780	-	Nuclear power plants - Electrical equipment of the safety system - Qualification	-	-
IEC 60812	-	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	EN 60812	-
IEC 60880	2006	Nuclear power plants - Instrumentation and control systems important to safety - Software aspects for computer-based systems performing category A functions	EN 60880	2009
IEC 60964	-	Nuclear power plants - Control rooms - Design	EN 60964	-
IEC 60965	-	Nuclear power plants - Control rooms - Supplementary control points for reactor shutdown without access to the main control room	-	-
IEC 60980	-	Recommended practices for seismic qualification of electrical equipment of the safety system for nuclear generating stations	-	-
IEC 60987	-	Nuclear power plants - Instrumentation and control important to safety - Hardware design requirements for computer-based systems	EN 60987	-
IEC 61000-4	Series	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques	EN 61000-4	Series
IEC 61000-6-2	-	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2	-
IEC 61513	2001	Nuclear power plants - Instrumentation and control for systems important to safety - General requirements for systems	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61771	-	Nuclear power plants - Main control-room - Verification and validation of design	-	-
IEC 61772	-	Nuclear power plants - Control rooms - Application of visual display units (VDUs)	-	-
IEC 61839	-	Nuclear power plants - Design of control rooms - Functional analysis and assignment	-	-
IEC 62138	-	Nuclear power plants - Instrumentation and control important for safety - Software aspects for computer-based systems performing category B or C functions	EN 62138	-
IAEA NS-R-1	2000	Safety of nuclear power plants: Design	-	-
IAEA GS-R-3	2006	The management system for facilities and activities : safety requirements	-	-
IAEA NS-G-1.3	2002	Instrumentation and control systems important to safety in nuclear power plants	-	-

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IEC 61226

Edition 3.0 2009-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Nuclear power plants – Instrumentation and control important to safety –
Classification of instrumentation and control functions**

**Centrales nucléaires de puissance – Instrumentation et contrôle-commande
importants pour la sûreté – Classement des fonctions d'instrumentation et de
contrôle-commande**

INTERNATIONAL
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COMMISSION
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**NUCLEAR POWER PLANTS –
INSTRUMENTATION AND CONTROL IMPORTANT TO SAFETY –
CLASSIFICATION OF INSTRUMENTATION AND CONTROL FUNCTIONS****FOREWORD**

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International Standard IEC 61226 has been prepared by subcommittee 45A: Instrumentation and control of nuclear facilities, of IEC technical committee 45: Nuclear instrumentation.

This third edition cancels and replaces the second edition published in 2005 and constitutes a technical revision. The main changes with respect to the previous edition are listed below:

- to introduce a definition for "non-hazardous stable state";
- to clarify limits of categories;
- to clarify requirements related to equipment used for beyond design events.

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

FDIS	Report on voting
45A/745/FDIS	45A/767/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.

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INTRODUCTION

a) Technical background, main issues and organisation of the standard

This International Standard responds to an International Atomic Energy Agency (IAEA) requirement¹ to classify nuclear power plants instrumentation and control systems according to their importance to safety. With distributed computer based I&C systems now being used for NPP instrumentation and control systems, the functions important to safety are distributed over several systems or subsystems. Therefore, it is the intent of this standard to

- classify the I&C functions important to safety into categories, depending on their contribution to the prevention and mitigation of postulated initiating events (PIE), and to develop requirements that are consistent with the importance to safety of each of the categories;
- assign specification and design requirements to I&C systems and equipment concerned which perform the classified functions.

According to IAEA recommendation,² the methods of classification are primarily based on the deterministic safety analysis, and should be complemented where appropriate by probabilistic methods. Several possible approaches for use of probabilistic safety assessment (PSA) for classification are described in IEC/TR 61838, “Nuclear power plants – Instrumentation and control important to safety – Use of probabilistic safety assessment for the classification of functions”.

This revision of the standard enables quantitative assessment to be partly taken into account.

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

IEC 61226 is directly referenced by IEC 61513 and is the second level SC 45A document tackling the issue of categorization of functions and classification of systems.

For more details on the structure of the SC 45A standard series see item d) of this introduction.

c) Recommendation and limitation regarding the application of this standard

Correct classification of functions directs the appropriate degree of attention by the plant's designers, operators and regulatory authorities to the specification, design, qualification, quality assurance (QA), manufacturing, installation, maintenance, and testing of the systems that ensure the safety functions.

¹ IAEA NS-R-1 requirement 5.1.

² The NS-R-1, section 5.2 requires that the method for classifying the safety significance of a structure, system or component shall be primarily based on deterministic methods complemented where appropriate by probabilistic methods and sound engineering judgment taking into account factors such as

- a) the safety function(s) to be performed;
- b) the consequences of failure to perform the function;
- c) the probability that it (the I&C system) will be required to perform a safety function;
- d) the time following a PIE at which, or the period throughout which it (the I&C system) will be called upon to operate.