SLOVENSKI STANDARD
oSIST prEN IEC 62566-2:2020

01-september-2020

Jedrske elektrarne - Merilna in nadzorna oprema za zagotavljanje varnosti - Razvoj HDL-programiranih integriranih vezij - 2. del: HDL-programirana integrirana vezja za sisteme, ki izvajajo funkcije kategorije B ali C

Nuclear power plants - Instrumentation and control systems important to safety - Development of HDL-programmed integrated circuits - Part 2: HDL-programmed integrated circuits for systems performing category B or C functions

Kernkraftwerke – Leittechnik für Systeme mit sicherheitstechnischer Bedeutung – Entwicklung HDL-programmierter integrierter Schaltkreise - Teil 2: HDL-programmierte integrierte Schaltkreise für Systeme, die Funktionen der Kategorie B oder C ausführen (IEC 62566-2:2020)

Centrales nucléaires de puissance – Instrumentation et contrôle-commande importants pour la sûreté – Développement des circuits intégrés programmés en HDL – Partie 2: Circuits intégrés programmés en HDL pour les systèmes réalisant des fonctions de catégorie B ou C

Ta slovenski standard je istoveten z: prEN IEC 62566-2:2020

ICS:

27.120.20	Jedrske elektrarne. Varnost	Nuclear power plants. Safety
31.200	Integrirana vezja, mikroelektronika	Integrated circuits. Microelectronics

oSIST prEN IEC 62566-2:2020 en

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN IEC 62566-2

July 2020

ICS 27.120.20

English Version

Nuclear power plants - Instrumentation and control systems important to safety - Development of HDL-programmed integrated circuits - Part 2: HDL-programmed integrated circuits for systems performing category B or C functions (IEC 62566-2:2020)

Centrales nucléaires de puissance - Instrumentation et contrôle-commande importants pour la sûreté - Développement des circuits intégrés programmés en HDL - Partie 2: Circuits intégrés programmés en HDL pour les systèmes réalisant des fonctions de catégorie B ou C (IEC 62566-2:2020)

Kernkraftwerke – Leittechnik für Systeme mit sicherheitstechnischer Bedeutung – Entwicklung HDL-programmierter integrierter Schaltkreise - Teil 2: HDL-programmierte integrierte Schaltkreise für Systeme, die Funktionen der Kategorie B oder C ausführen (IEC 62566-2:2020)

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2020-10-09.

The text of this draft consists of the text of IEC 62566-2:2020.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denma Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to prov supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and sha be referred to as a European Standard.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Project: 71985

Ref. No. prEN IEC 62566-2:2020 E

European foreword

This document (prEN IEC 62566-2:2020) consists of the text of document IEC 62566-2:2020, prepared by IEC/TC 45 "Instrumentation, control and electrical power systems of nuclear facilities"

This document is currently submitted to the CENELEC Enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

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 and/or security measures in the subject-matter covered by this standard.

Bibliography

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC/IEEE 60780-323:2016	NOTE	Harmonized as EN 60780-323:2017 (not modified)
IEC 61508-1:2010	NOTE	Harmonized as EN 61508-1:2010 (not modified)
IEC 61508-2:2010	NOTE	Harmonized as EN 61508-2:2010 (not modified)
IEC 61508-3:2010	NOTE	Harmonized as EN 61508-3:2010 (not modified)
IEC 61508-4:2010	NOTE	Harmonized as EN 61508-4:2010 (not modified)
IEC 62645	NOTE	Harmonized as EN IEC 62645 to be published

Annex ZA
(normative)
Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 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 60987	-	Nuclear power plants - Instrumentation and control important to safety - Hardware design requirements for computer-based systems	EN 60987	-
IEC 61226	-	Nuclear power plants - Instrumentation and control important to safety - Classification of instrumentation and control functions	EN 61226	-
IEC 61513	2011	Nuclear power plants - Instrumentation and control important to safety - General requirements for systems	EN 61513	2013
IEC 62138	2018	Nuclear power plants - Instrumentation and control systems important to safety - Software aspects for computer-based systems performing category B or C functions	EN IEC 62138	2019
IEC 62340	-	Nuclear power plants - Instrumentation and control systems important to safety - Requirements for coping with common cause failure (CCF)	EN 62340	-
IEC 62566	2012	Nuclear power plants - Instrumentation and control important to safety - Development of HDL-programmed integrated circuits for systems performing category A functions	EN 62566	2014

IEC 62566-2

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Nuclear power plants – Instrumentation and control important to safety – Development of HDL-programmed integrated circuits – Part 2: HDL-programmed integrated circuits for systems performing category B or C functions

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NUCLEAR POWER PLANTS – INSTRUMENTATION AND CONTROL IMPORTANT TO SAFETY – DEVELOPMENT OF HDL-PROGRAMMED INTEGRATED CIRCUITS –

Part 2: HDL-programmed integrated circuits for systems performing category B or C functions

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 62566-2 has been prepared by subcommittee 45A: Instrumentation, control and electrical power systems of nuclear facilities, of IEC technical committee 45: Nuclear instrumentation.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
45A/1304/FDIS	45A/1314/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62566 series, published under the general title *Nuclear power plants – Instrumentation and control important to safety – Development of HDL-programmed integrated circuits*, can be found on the IEC website.

In this document, the following print types are used:

– *Requirements and recommendations applicable specifically to class 3 or to class 2 systems appear in italics.*

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

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

Electronic systems performing category B and C functions (according to IEC 61226) used in Nuclear Power Plants (NPPs) need to be fully validated and qualified according to their safety class. This International Standard provides requirements for the development of class 2 or 3 HDL (Hardware Description Language) Programmed Devices (HPDs) performing category B or C functions as defined by IEC 61226. It complements IEC 62566 which provides requirements for the development of HPDs performing category A functions.

In computer-based systems, a separation can be drawn between the hardware and software portions. The hardware is mainly designed with standardised components having pre-defined electronic functions such as microprocessors, timers or network controllers, whereas software is used to coordinate the different parts of the hardware and to implement the application functions.

I&C designers might build application functions using integrated circuits such as FPGAs or similar technologies. The function of such an integrated circuit is not defined by the supplier of the physical component or micro-electronic technology but by the I&C designer.

The specific integrated circuits addressed by this Standard are:

a) based on pre-developed micro-electronic technologies,
b) developed within an I&C project,
c) developed in Hardware Description Languages (HDL) by using appropriate and compatible development tools.

Therefore these circuits are named “HDL-Programmed Devices”, (HPD). The HDL statements which describe a HPD can include the instantiation of Pre-Developed Blocks (PDB) which are typically provided as libraries, macros, or intellectual property cores.

HPDs can be effective solutions to implement functions required by an I&C project. However, the verification and validation might be limited by issues such as high number of internal paths and limited observability, if the HPD has not been developed with verifiability in mind.

In order to achieve the reliability required for safety I&C systems, the development of HPDs shall comply with strict process and technical requirements such as those provided by this Standard, including the specification of requirements, the selection of blank integrated circuits and PDBs, the design and implementation, the verification, and the procedures for operation and maintenance.

It is intended that this Standard be used by HPD designers, operators of NPPs (utilities), and by regulators. Regulatory bodies will find guidance to assess important aspects such as design, implementation, verification and validation of HPDs.

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

IEC 61513 is a first level IEC SC 45A document and gives guidance applicable to I&C at the system level. It is supplemented by guidance at the hardware level (IEC 60987), software level (IEC 60880 and IEC 62138) and HPD level (IEC 62566 and IEC 62566-2). IEC 62340 gives requirements in order to reduce and overcome the possibility of common cause failure of category A functions.