

BUREAU OF INDIAN STANDARDS

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मसौदा भारतीय मानक

परमाणु ऊर्जा यंत्र –
सुरक्षा के लिए महत्वपूर्ण इंस्ट्रुमेंटेशन और नियंत्रण प्रणालियाँ

–
कंप्यूटर के लिए सॉफ्टवेयर पहलू-
श्रेणी ए के कार्य करने वाली आधारित प्रणालियाँ

(पहला पुनरीक्षण)

Draft Indian Standard

***Nuclear power plants –
Instrumentation and control systems important to
safety - Software aspects for computer-
based systems performing category A functions***

(First Revision)

ICS 27.120.20

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NATIONAL FOREWORD

(Formal clauses will be added later)

This Draft Indian Standard (First Revision) which is identical with IEC 60880:2006 ‘Nuclear power plants - Instrumentation and control systems important to safety - Software aspects for computer-based systems performing category A functions’ issued by the International Electrotechnical Commission (IEC) *will be* adopted by the Bureau of Indian Standards on the recommendation of Electronic Measuring Instruments, Systems And Accessories Sectional Committee, LITD 08 and approval of the Electronics and Information Technology Division Council.

This standard was originally published in 2003 and was identical with IEC 60880:1986. The first revision of this standard has been taken to align it with the latest version of International Standard IEC 60880:2006.

This second edition cancels and replaces the first edition published in 1986 and IEC 60880-2 published in 2000. It constitutes a technical revision.

The revision of the standard is intended to accomplish the following:

- To take into account the fact that software engineering techniques advanced significantly in the intervening years.
- To align the standard with the new revisions of IAEA documents NS-R-1 and NS-G-1.3.

This includes as far as possible adaptation of the definitions

To replace, as far as possible, requirements associated with standards published since the first edition of IEC 60880, especially IEC 61513, IEC 61226 edition 2, IEC 62138 and IEC 60987.

- To fully integrate IEC 60880-2 published in 2000 as chapters 13, 14, 15 and annexes G, H, I.
- To review the existing requirements and to update the terminology and definitions

The text of IEC Standard *may be* approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words ‘International Standard’ appears referring to this standard, they should be read as ‘Indian Standard’.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

International standards	Corresponding Indian standards	Degree of Equivalence
IEC 61508-4, Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 4: Definitions and abbreviations	IS/IEC 61508-4 : 2010 Functional safety of electrical/electronic/programmable electronic safety-related systems : Part 4 Definitions and abbreviations	Identical with IEC 61508-4 :2010

The technical committee has reviewed the provisions of the following international standards referred in this adopted draft standard and has decided that it is acceptable for use in conjunction with this standard. For dated references, only the edition cited applies. For updated references, the latest edition of the referenced document (including any amendments) applies:

International Standards	Titles
IEC 60671,	Periodic tests and monitoring of the protection system of nuclear reactors
IEC 61069-2:1993,	Industrial-process measurement and control – Evaluation of system properties for the purpose of system assessment – Part 2: Assessment methodology
IEC 61226,	Nuclear power plants – Instrumentation and control systems important for safety – Classification of instrumentation and control functions
IEC 61513,	Nuclear power plants – Instrumentation and control for systems important to safety – General requirements for systems
IAEA guide NS-G-1.2,	Safety Assessment and Verification for Nuclear power Plant
IAEA guide NS-G-1.3,	Instrumentation and Control Systems Important to Safety in Nuclear Power Plants
ISO/IEC 9126	Software engineering – Product quality

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:2022 ‘Rules for rounding off numerical values (*Second*

Revision)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

SCOPE OF IEC 60880:2006

“This International Standard provides requirements for the software of computer-based I&C systems of nuclear power plants performing functions of safety category A as defined by IEC 61226.

According to the definition in IEC 61513, I&C systems of safety class 1 are basically intended to support category A functions, but may also support functions of lower categories. However the system requirements are always determined by the functions of the highest category implemented.

For software of I&C system performing only category B and C functions in NPP as defined by IEC 61226, requirements and guidance of IEC 62138 are applicable.

This standard provides requirements for the purpose of achieving highly reliable software. It addresses each stage of software generation and documentation, including requirements specification, design, implementation, verification, validation and operation.

The principles applied in developing these requirements include:

- best available practices;
- top-down design methods;
- modularity;
- verification of each phase;
- clear documentation;
- auditable documents;
- validation testing.

Additional guidance and information on how to comply with the requirements of the main part of this standard is given in Annexes A to I.”

Note: - The Technical content of this document has not been enclosed as these are identical with the corresponding IEC Standard. For details, please refer to IEC 60880:2006 or kindly contact.

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