

Nuclear power plants — Instrumentation and control systems important for safety — Requirements for electrical supplies

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Nuclear Engineering Standards Policy Committee (NCE/-) to Technical Committee NCE/8, upon which the following bodies were represented:

- AEA Technology
- British Aerospace plc
- British Nuclear Forum
- British Nuclear Fuels plc
- Electricity Association
- GAMBICA (BEAMA Ltd.)
- Health and Safety Executive
- Institution of Nuclear Engineers

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Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
1 Scope	1
2 Normative references	1
3 Definitions	1
4 System requirements	1
5 Requirements for independence, physical separation and redundancy	2
6 Functional requirements for I & C power supplies	2
7 Requirements for distribution system design	3
8 Effects of influence conditions	4
9 Characteristics of supplies given to individual loads	5
10 Monitoring and protection	5
11 Qualification of equipment	6
12 Testing	6
13 Maintenance	6
Annex A (informative) Examples of specifications	13
Figure 1 — System boundary	7
Figure 2 — DC power system	8
Figure 3 — Non-interruptible a.c. power system	9
Figure 4 — One division of the I & C power supply system	10
Figure 5 — Example of I & C non-interruptible a.c. power system	11
Figure 6 — Example of d.c. system	12
List of references	Inside back cover

National foreword

This British Standard has been prepared under the direction of the Nuclear Engineering Standards Policy Committee and is identical with IEC 1225:1993, *Nuclear power plants — Instrumentation and control systems important for safety — Requirements for electrical supplies*, published by the International Electrotechnical Commission (IEC).

IEC 1225 was produced as a result of international discussions in which the United Kingdom took an active part.

Cross-references

International standard	Corresponding British Standard
	BS 5654: <i>Stabilized power supplies, d.c. output</i>
IEC 478-1:	Part 1:1979 <i>Terms and definitions</i> (Identical)
IEC 478-2:	Part 2:1979 <i>Method of specifying rating and performance</i> (Identical)
IEC 478-4:	Part 4:1979 <i>Tests other than radio frequency interference</i> (Identical)
	BS 6667: <i>Electromagnetic compatibility for industrial-process measurement and control equipment</i>
IEC 801-1:	Part 1:1985 <i>General introduction</i> (Identical)
IEC 801-2:	Part 2:1985 <i>Method of evaluating susceptibility to electrostatic discharge</i> (Identical)
IEC 801-3:	Part 3:1985 <i>Method of evaluating susceptibility to radiated electromagnetic energy</i> (Identical)

The Technical Committee has reviewed the provisions of the following IEC Standards and IAEA Safety Guides to which normative reference is made in the text and has decided that they are acceptable for use in conjunction with this standard.

IEC 38:1983
 IEC 146-2:1974
 IEC 146-4:1986
 IEC 293:1968
 IEC 557:1982
 IEC 639:1979
 IEC 686:1980
 IEC 709:1981
 IEC 780:1984
 IEC 896
 IEC 980:1989
 IAEA Safety Guide 50-SG-D3:1980
 IAEA Safety Guide 50-SG-D7 Rev. 1:1991
 IAEA Safety Guide 50-SG-D8:1984

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This International Standard specifies the performance and the functional characteristics of the electrical supply systems required for the instrumentation and control (I&C) systems important to safety of a nuclear power plant. Guidance is also given on the possible use of these supplies for other I&C systems.

These supplies are required to be fed from primary sources of suitable redundancy and reliability, such that the safety and functional objective of the I&C system can be adequately achieved.

This standard defines the methods of application of IAEA Safety Guides 50-SG-D3, 50-SG-D7 and 50-SG-D8.

The specific design requirements for the components of the I&C power supply system are outside the scope of this standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 38:1983, *IEC standard voltages*.

IEC 146-2:1974, *Semiconductor convertors — Part 2: Semiconductor self-commutated convertors*.

IEC 146-4:1986, *Semiconductor convertors — Part 4: Method of specifying the performance and test requirements of uninterruptible power systems*.

IEC 293:1968, *Supply voltages for transistorized nuclear instruments*.

IEC 478, *Stabilized power supplies, d.c. output*.

IEC 557:1982, *IEC terminology in the nuclear reactor field*.

IEC 639:1979, *Nuclear reactors — Use of the protection system for non-safety purposes*.

IEC 686:1980, *Stabilized power supplies, a.c. output*.

IEC 709:1981, *Separation within the reactor protection system*.

IEC 780:1984, *Qualification of electrical items of the safety system for nuclear power generating stations*.

IEC 801, *Electromagnetic compatibility for industrial-process measurement and control equipment*.

IEC 896, *Stationary lead acid batteries — General requirements and methods of test*.

IEC 980:1989, *Recommended practices for seismic qualification of electrical equipment of the safety system for nuclear generating stations*.

IAEA Safety guide 50-SG-D3:1980, *Protection system and related featuring in nuclear power plants*.

IAEA Safety guide 50-SG-D7 Rev. 1:1991, *Emergency power system of nuclear power plants*.

IAEA Safety guide 50-SG-D8:1984, *Safety related instrumentation and control system for nuclear power plants*.

3 Definitions

For the purpose of this International Standard, the following definitions apply:

I&C systems important to safety

see Guide of IAEA 50-SG-D8

safety systems

see IEC 557

I&C safety related systems

see Guide of IAEA 50-SG-D8

separation within the reactor protection system

see IEC 709

safety system support features (power supplies)

see IEC 557

I&C non-interruptible electrical power supply systems

systems which will not be lost solely as a result of loss of off-site and on-site power sources (see Figure 1 and Figure 3)

stationary lead acid batteries

see IEC 896

other terms not defined above are defined in IAEA Safety Guide 50-SG-D7

4 System requirements

4.1 Function and description

I&C electrical supplies generally consist of the following non-interruptible systems (see Figure 1):

- a d.c. power system with batteries, supplying d.c. loads;
- an a.c. power system with internal batteries, supplying a.c. loads.