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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 19661.1-2025

Replacing GB/T 19661.1-2005

**Safety requirements for nuclear instrumentations and systems -
Part 1: General requirements**

核仪器及系统安全要求 第1部分：通用要求

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

This document is Part 1 of GB/T 19661, "Safety Requirements for Nuclear Instruments and Systems". GB/T 19661 has already published the following parts.

- Part 1: General Requirements;
- Part 2: Structural requirements and classification of radiometric measuring instruments.

This document supersedes GB/T 19661.1-2005 "Safety requirements for nuclear instruments and systems - Part 1: General requirements", and is consistent with GB/T 19661.1- Compared to 2005, aside from structural adjustments and editorial changes, the main technical changes are as follows.

- a) Added a description of applicable nuclear instruments (see Chapter 1);
- b) Increased safety design requirements for intelligent and automated nuclear instruments and systems (see Chapter 4);
- c) The relative humidity requirements for environmental conditions in safety requirement checks and tests have been changed (see 5.2, 4.2.2 of the 2005 edition);
- d) The description of "protection against electric shock" has been changed (see 6.1, 5.1.1 of the 2005 edition);
- e) The description of "safe extra-low voltage" and the voltage limit requirements in dry environments have been revised (see 6.3.1, 5.1.2 of the 2005 edition);
- f) The "Electric Shock Protection Category" has been removed (see 5.3 in the 2005 edition);
- g) The description of "Anti-electric Shock Measures" has been changed (see 6.4, 5.4 in the 2005 edition);
- h) The circuit classification in "Circuit Type" has been changed (see 6.5.1.5, 5.5.2.6 in the

2005 version);

i) The values for clearance and creepage distance have been changed (see 6.5.2.1, 6.5.3.1 and 6.5.3.2, and 5.5.3 in the 2005 edition);

j) Requirements and testing for solid insulation have been added (see 6.5.2.2 and 6.5.3.3);

k) The overview of dielectric strength testing has been removed (see 5.6.1 in the 2005 edition);

l) The "Test Voltage Values for Basic Insulation" has been removed (see Table 10 in the 2005 edition);

m) The holding time requirements for AC/DC voltage tests have been changed, and a moisture pretreatment requirement for manually removable components has been added (see m).

6.6.4 (5.6.5 in the 2005 edition);

n) The repeatability requirements for voltage test voltages with an effective value greater than or equal to 2000V have been changed (see 6.6.6, 2005 edition). 5.6.7);

o) The requirement for factory testing in the voltage test has been removed (see 5.6.8 in the 2005 version);

p) The requirements for plugs and connectors in the connection and protection with mains power have been changed (see 6.9.2, 5.9.2 of the 2005 edition);

q) The requirements for the overload characteristics of radiation protection instruments have been changed (see Chapter 7, Chapter 6 of the 2005 edition);

r) The requirements for protection against mechanical hazards have been changed (see 8.2, 8.4 in the 2005 edition);

s) Increased requirements for preventing hazards from fluids and solid foreign objects (see 8.5);

t) The overview requirements for protection against strong penetrating radiation have been revised (see 8.6.1, 8.2.1 of the 2005 edition);

u) The requirements for noise and ultrasonic protection have been changed (see 8.8, 8.5 in the 2005 edition);

v) The requirements for preventing the leakage of hazardous substances have been changed (see 8.9, 8.3 of the 2005 edition);

w) The explosion protection requirements have been changed (see 8.10, 8.8 in the 2005 edition);

x) The requirements for the decontamination of nuclear instruments have been changed

(see 8.11, Chapter 7, 2005 edition);

y) The color requirements for safety sign graphic symbols have been changed (see 9.1.1, 2005 version of 9.1.1);

z) The size requirements for warning signs have been changed (see 9.1.2, 9.1.4 in the 2005 edition);

aa) The calculation of electrical clearance and creepage distance for secondary circuits has been added (see Appendix C).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Nuclear Instruments and Meters (SAC/TC30).

This document was drafted by: Institute of Materials, China Academy of Engineering Physics; Institute of Nuclear Industry Standardization; and China State Shipbuilding Corporation Limited.

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The release history of this document and the document it replaces is as follows.

- First published in 2005 as GB/T 19661.1-2005;

- This is the first revision.

Safety requirements for nuclear instruments and systems Part 1: General Requirements

1 Scope

This document specifies the general safety requirements for nuclear instruments and systems, including general principles of safety design, inspection and testing, protection against electric shock, and radiation protection.

Protect the instrument from overload characteristics, prevent other hazards, and include safety signs and accompanying documents.

This document applies to the research, design, production, inspection, storage, transportation, installation, and use of nuclear instruments and systems (hereinafter referred to as "nuclear instruments").

The same principles apply to the determination of "safety requirements" in nuclear instrument product standards, including maintenance, etc.