

ICS 13.280

CCS F 84



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

GB/T 12787-2020

Replacing GB/T 12787-1991

**Radiation protection instrumentation. Warning equipment for
criticality accidents**

Issued on: November 19, 2020

Implemented on: June 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms, definitions, quantities and units	1
3.1 Terms and definitions	1
3.2 Quantity and unit	2
4 General requirements	2
4.1 General	2
4.2 Detection requirements	3
4.3 Safety classification	3
4.4 False alarm	3
4.5 Component failure	3
4.6 Easy to decontaminate	4
4.7 Multifunctional system	4
4.8 Connecting cables and connectors	4
4.9 Reliability	4
4.10 Function test	4
4.11 Interchangeability	4
4.12 Detecting component	4
4.13 Signal Processing Logic Unit	4
4.14 Alarm signal unit	4
5 General test methods	5
5.1 Test characteristics	5
5.2 Reference conditions and standard test conditions	5
5.3 Test point	6
5.4 Reference radiation	6
6 Radiation detection requirements	6
6.1 General requirements	6
6.2 Energy response	6
6.3 Alarm time	7
6.4 Detection alarm threshold	7
6.5 Variation of response with incident angle	7
6.6 Overload characteristics	7

7 Environmental requirements	8
7.1 Temperature test without radioactive source or input electronic signal	8
7.2 Environmental test with radioactive source or input electronic signal	8
8 Mechanical requirements	8
9 EMC requirements	8
10 File	9
Reference	11

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 12787-1991 "critical accident alarm equipment", compared with GB/T 12787-1991, the main technical changes

as follows.

---Added the main function description, safety classification requirements and failure mode and impact analysis requirements of the critical alarm system (see 4.1, 4.3 and 4.5);

--- The requirements for false alarms of critical alarm systems have been modified (see 4.4, 4.3 in the 1991 edition);

---Modified the energy response test method for neutron detectors (see 6.2.3.2, 5.1.1.4 of the 1991 edition);

---Modified the requirements and test methods related to environment, machinery and electromagnetic compatibility (see Chapter 7, Chapter 8, and Chapter 9, 1991 edition 5.2, 5.3 and 5.4).

The translation method used in this standard is equivalent to IEC 60860.2014 "Radiation Protection Instrument Critical Accident Alarm Equipment".

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows.

---GB/T 2900 (all parts) Electrical terminology [IEC 60050 (all parts)];

---GB/T 15146.9-1994 Nuclear criticality safety of fissile materials outside the reactor
Nuclear criticality accident detection and alarm system

Performance and inspection requirements (equiv ISO 7753.1987);

---GB/T 20438 (all parts) Functional safety of electrical/electronic/programmable electronic safety-related systems [IEC 61508 (all parts)];

---GB/T 34138-2017 Environmental, electromagnetic and mechanical performance requirements for radiation protection instruments (IEC 62706.2012, IDT).

This standard has made the following editorial changes.

---According to our country's custom, the expression of the nominal frequency in Table 1, use "94%Fn~110%Fn" instead of "-6%~10%";

--- In 6.2.2.1, use "65%~150%" instead of "-35%~50%".

This standard was proposed and managed by the National Standardization Technical Committee for Nuclear Instruments (SAC/TC30).

Drafting organization of this standard. China Nuclear Power Engineering Co., Ltd.

1 Scope

This standard applies to equipment that issues an alarm by detecting gamma radiation and/or neutrons produced by criticality accidents.

This standard is mainly used for the design of equipment and does not involve the layout requirements of the equipment. Layout requirements and usage methods of critical alarm equipment

Described in ISO 7753 and ISO 11320.

The main purpose of criticality alarm equipment is to detect the radiation produced by criticality accidents and warn people. The equipment should provide appropriate alarms

When a criticality accident occurs, warn people in the critical accident area and the nearby affected area (usually the entire nuclear facility). The purpose of this alarm is to touch

Send an evacuation alarm to reduce the possibility of personnel being severely exposed.

The device can also have auxiliary functions, such as. setting continuous measurement of radiation levels during an accident.

And the important characteristics described in this standard (for example. reliability), you can use these auxiliary functions.

The goal of this standard is to specify requirements for general characteristics, radiation detection, environment, machinery, electromagnetic compatibility and documentation, and to formulate critical accident reports.

Acceptance criteria for police devices.

This standard does not apply to photon or neutron dose equivalent (rate) measuring instruments or monitors, which are controlled by IEC 60532, IEC 60846 (all

Part), IEC 61017 (all parts) and IEC 61005. This standard also does not apply to equipment

for nuclear reactor control and safety systems

And parts.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO 7753.1987 Nuclear energy criticality detection and alarm system performance and inspection requirements

IEC 60050 (all parts) International Electrotechnical Vocabulary

IEC 61508 (all parts) Functional safety of electrical/electronic/programmable electronic safety systems

IEC 62706 Radiation protection instrument environment, electromagnetic and mechanical performance requirements

International Bureau of Weights and Measures. International System of Units, 8th Edition, 2006

3.1 Terms and definitions

The following terms and definitions defined by IEC 60050-395 apply to this document.

3.1.1

Acceptance test

In order to prove to the customer that the instrument meets the contract test requirements specified in the specification.