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

GB/T 47509-2026

**Resistance temperature detectors important to safety in nuclear
power plants**

核电厂安全重要电阻温度计

(English Translation)

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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 modified to adopt IEC 62397:2022 "Safety-Important Instruments and Controls for Nuclear Power Plants - Resistance Thermometers".

This document has undergone the following structural adjustments compared to IEC 62397:2022.

---The abbreviations in IEC 62397:2022 have been removed (see section 3.2 of IEC 62397:2022);

---Chapter 3 corresponds to section 3.1 of IEC 62397:2022; the corresponding entry numbers have been adjusted sequentially according to their original order.

---Adjust the in-situ measurement content in sections 4.7.1 and 4.7.5 of IEC 62397:2022 to section 4.7.14 (see sections 4.7.5 and 4.7.14);

---5.5.1 and 5.5.2 correspond to 5.5 in IEC 62397:2022;

---6.1, 6.2, and 6.3 correspond to Chapter 6 of IEC 62397:2022;

The technical differences between this document and IEC 62397:2022, and the reasons therefor, are as follows.

---The description of mechanical connection types has been deleted because this content is not within the scope of the standard and has already been described in detail in 4.4.3 (see Chapter 1);

---Added operating condition specifications for resistance thermometers to meet the various operating conditions of nuclear power plants (see 4.1);

---The specific dimensions in Figure 1 have been removed to better reflect my country's national conditions (see 4.4.1);

---The requirement that "the resistance thermometer should be easily accessible when the junction box is opened" is changed to a recommended clause to suit my country's national conditions (see 4.4.2.2);

---The specific recommended value for spring force has been removed to better suit my country's national conditions (see 4.4.3.1);

---Process conditions have been added to the environmental conditions to adapt to my country's national conditions (see 4.6, 6.1);

---A detailed explanation of the relative error has been added to echo the following text (see

4.7.1);

---The description of the response time test method in the general performance rules has been deleted because it overlaps with the content of the response time section in 4.7.14 (see 4.7.1);

---The scope of application of formula (1) has been expanded to make the description more complete (see 4.7.3);

---The temperature coefficient in the self-heating error calculation has been changed to 0.00385, and the corresponding self-heating error value has been calculated and modified to improve the standard.

Operability (see 4.7.4);

---Added a description of the applicability of the hydrostatic test; and distinguished between cases with and without sleeves in the acceptance criteria to improve the standard.

Accurate operability (see 4.7.13);

---The description of the self-heating test method has been revised to improve the operability of the standard (see 5.4.3);

---The description of factory acceptance testing has been revised to refer to 5.5.2, and the content of qualification testing, product testing, and factory acceptance testing has been adjusted according to the product specifications.

The manufacturing sequence of the products will be adjusted to adapt to my country's national conditions and improve the operability of the standards (see 5.1);

---Added "Users can adjust the test methods" to adapt to my country's national conditions (see 5.4.11);

---IEC/IEEE 60980-344 (see 5.4.7, 5.6) has been replaced with the normatively referenced GB/T 13625, with a gap between the two documents.

The degree of consistency needs to be modified to suit my country's technical conditions and increase operability;

---Added "or X-ray test" to the non-destructive testing entry to be consistent with 4.4.3.2 (see 5.5.1).

---IEC/IEEE 60780-323 (see 5.6) has been replaced with the normatively referenced GB/T 12727, ensuring consistency between the two documents.

The modifications aim to adapt to my country's technological conditions and increase operability.

---The description of the qualification test requirements has been revised. The qualification method should be implemented in accordance with the existing thermometer qualification

standard GB/T 25838 to adapt to our needs.

The country's national conditions (see 5.6);

---Regarding the principles of noise analysis and self-heating methods, refer to NB/T 20338 and refine the algorithm description to increase the standard's practicality (see...).

Appendix A (A.2 and A.3).

The following editorial changes have been made to this document.

---To align with my country's standards system, the title of this document has been changed to "Important Resistance Thermometers for Nuclear Power Plant Safety";

---The section on abbreviations in IEC 62397:2022 has been deleted (see section 3.2 of IEC 62397:2022);

---The list of references has been changed.

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).

1 Scope

This document specifies the requirements for safety-critical resistance thermometers in nuclear power plants, including design, material selection, manufacturing, testing, calibration, procurement, and inspection.

aspect.

This document applies to safety-critical resistance thermometers in nuclear power plants; resistance thermometers in other nuclear facilities should refer to this document for further information.

This document does not include the design, material selection, or specifications for bushings, guide tubes, extension cables, and temperature transmitters or bridges related to resistance thermometers.

Construction and other requirements.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.