

ICS 27.120.20
CCS F 69



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

GB/T 45569-2025

**Design criteria for the thermal insulation of reactor coolant
system main equipments and piping of PWR nuclear power
plants**

(English Translation)

Issued on: April 25, 2025

Implemented on: April 25, 2025

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

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is modified to adopt ISO 23466:2020 "Design criteria for insulation of reactor coolant system equipment and piping in pressurized water reactor nuclear power plants".

Compared with ISO 23466:2020, this document has many structural adjustments. Comparison table of structural number changes between the two documents See Appendix A.

This document has many technical differences compared to ISO 23466:2020.

A single line (|) is used to indicate these technical differences. A list of these technical differences and their reasons is given in Appendix B.

The following editorial changes were made to this document.

--- In Chapter 3, the ISO and IEC international terminology reference URLs were deleted;

--- Deleted the contents in 5.2 and 6.2 that were repeated in 4.2.2;

---In Appendix C, the description of the metal insulation layer structure is unified, and the two-dimensional insulation block structure diagram is changed to a three-dimensional diagram, which is more convenient to view.

Intuitive;

--- Appendix D clarifies the types of non-metallic insulation layers and adds the description of "insulation pad" to make the content more complete;

--- The description of forced circulation reactor cavity water injection is added in Appendix E to make the form of reactor cavity water injection more complete;

--- Change the figure in Appendix F to an intuitive schematic diagram;

---Removed references.

1 Scope

This document specifies the basic requirements for the design of insulation for reactor coolant system (RCS) equipment and piping in pressurized water reactor nuclear power plants.

This document is applicable to the metal insulation layer and non-metal insulation layer of RCS equipment and pipelines in pressurized water reactor nuclear power plants, and other reactor types can refer to it for implementation.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 4132 Thermal insulation terminology (GB/T 4132-2023, ISO 9229:2020, IDT) GB/T 10294 Determination of steady-state thermal resistance and related properties of thermal insulation materials - Guarded hot plate method GB/T 10296 Determination of steady-state heat transfer properties of thermal insulation layers - Circular tube method GB/T 13475 Determination and calibration of adiabatic steady-state heat transfer properties and guarded hot box method

3 Terms and definitions

The terms and definitions defined in GB/T 4132 and the following apply to this document.

The main heat insulation material is a heat preservation layer of metal material.

The main thermal insulation material is a thermal insulation layer of non-metallic material.

Chimney effect

Air circulation between the inside and outside of the insulation layer caused by temperature differences.

4.1 General requirements

The design of the insulation layer should comprehensively consider the requirements for achieving all its functions, and its quality assurance level and resistance should be determined according to the overall technical requirements of the nuclear power plant.

The following factors should be considered in the design of the insulation layer.

---Material selection;

--- Thermal performance design and testing;