

ICS 27.120.20

CCS F69



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

GB/T 16702.2-2025

Replacing GB/T 16702-2019

**Design specification for mechanical components in nuclear
island of pressurized water reactor nuclear power plants - Part
2: Class 1 components**

压水堆核电站核岛机械设备设计规范 第2部分：1级设备

Issued on: February 28, 2025

Implemented on: February 28, 2025

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

Table of Contents

1	Scope
2	Normative references
3	Level 2 equipment
4	General
4.1	Boundaries of components and accessories of Class 1 equipment and piping
4.2	File
4.3	Identification
5	Level
5.1	Overview
5.2	Selection of materials
5.3	Intergranular corrosion susceptibility
5.4	Cobalt content requirements
6	Reactor internals
6.1	Design rules
6.2	General principles for equipment performance analysis
6.3	General design of containers
6.4	Pump Design
6.5	General design of valves
6.6	Pipeline Design
7	Manufacturing and Inspection
7.1	Overview
7.2	Preliminary documentation and requirements for manufacturing and inspection
7.3	Manufacturing Process
7.4	Welding related technical requirements
8	Pressure testing of Class 1 equipment
8.2	General requirements for water pressure testing
8.3	Special test requirements for valves
9	Overpressure protection
9.2	Overpressure Analysis Report
9.3	Displacement Requirements
9.4	Set pressure of direct pressure limiting device
9.5	Technical requirements for the design and operation of pressure relief valves

9.6 Non-reclosing pressure relief devices

9.7 Determination of displacement

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 Part 2 of GB/T 16702 "Design Specification for Mechanical Equipment of Nuclear Island in Pressurized Water Reactor Nuclear Power Plant". The following parts are published.

2. Class 1 equipment;

3. Level 2 equipment;

4. Level 3 equipment;

5. Small equipment;

6. Reactor internals;

7. Equipment support;

8. Low-pressure or atmospheric pressure storage tanks. This document replaces Chapter

1 Scope

GB/T 16702.2-2025 is the Chinese national standard on design specification for mechanical components in nuclear island of pressurized water reactor nuclear power plants - part 2: class 1 components, in the field of energy and heat transfer engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 February 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 28 February 2025. Classification: ICS 27.120.20, CCS F69. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document specifies the materials, design, manufacturing, inspection and overpressure protection of Class 1 pressure equipment in the nuclear island mechanical equipment of a pressurized water reactor nuclear power plant. Requirements and corresponding tests are described. This document applies to the design of Class 1 pressure equipment and its

components as specified in Chapter 5 of GB/T 16702.1-2025.

2 Normative references

The contents of the following documents constitute the 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 16702.1-2025 Specification for design of mechanical equipment for pressurized water reactor nuclear island Part

3 Level 2 equipment

GB/T 16702.6-2025 Specification for design of mechanical equipment for pressurized water reactor nuclear island Part

5 Level

1 Equipment of GB/T 16702-2019 "Design Specifications for Mechanical Equipment of Nuclear Island in Pressurized Water Reactor Nuclear Power Plants" and Compared with Chapter 5 in GB/T 16702-2019, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- Added the boundaries of components and accessories of Level 1 equipment and pipelines (see 4.1);
- Changed the material standard number; added 1 level of passive residual heat removal heat exchanger, core water tank, main pump external heat exchanger, etc. Equipment and material selection (see Table 1, Table 2 of the.2019 edition);
- Changed the description of working condition classification (see 6.1.2, 5.3.1.2 of the.2019 edition);
- Added B-level criteria and T-level criteria (see 6.1.4);
- Added some typical stress classifications (see 6.2.3.1.7);
- Changed the stress limits under some working conditions (see 6.2.3, 5.3.2.3 of the.2019 edition);
- Added design principles for geometric and load discontinuity areas [see 6.3.4.2c)];
- Increased maintainability (see 6.3.4.3);
- Added the design of pressure relief valve (see 6.5.7);

--- Changed Table 7 and added the last two columns of materials and their corresponding data (see Table 7, Table 7 of the.2019 edition);

--- Changed the requirements for copper and phosphorus content in the weld metal of the high intensity irradiation zone in the welding procedure qualification of low alloy steel butt welds [see 7.2.3.1a), 5.4.2.3.1a) of the.2019 edition];

6 Reactor internals

GB/T 16702.7-2025 Specification for design of mechanical equipment for pressurized water reactor nuclear island Part

7.Equipment support parts NB/T.20001 Specification for the manufacture of mechanical equipment for nuclear island of pressurized water reactor nuclear power plant NB/T.20002.1 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

1.General requirements NB/T.20002.2 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

2.Acceptance of welding filler materials NB/T.20002.3 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

3.Welding procedure qualification NB/T.20002.4 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

4.Evaluation of welding filler materials NB/T.20002.5 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

5.Assessment of manufacturing workshop NB/T.20002.6 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

6.Product welding NB/T.20002.7 Specification for welding of mechanical equipment in nuclear island of pressurized water reactor nuclear power plant Part

7.Wear resistant cladding NB/T.20003.3 Nondestructive testing of mechanical equipment in nuclear island of nuclear power plant Part

3.Radiographic testing NB/T.20003.4 Nondestructive testing of mechanical equipment in nuclear island of nuclear power plant Part

4.Penetrant testing NB/T.20004 Physical and chemical testing methods for mechanical equipment materials in nuclear islands of nuclear power plants NB/T.20005.1 Carbon steel and low alloy steel for pressurized water reactor nuclear power plants Part