

ICS 27.140
CCS K55



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

GB/T 14478-2025

Replacing GB/T 14478-2012

**Basic technical specification of inlet valves for large and
medium-sized hydraulic turbines**

大中型水轮机进水阀门基本技术规范

Issued on: February 28, 2025

Implemented on: September 1, 2025

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

Table of Contents

Foreword...	3
1 Scope...	7
2 Normative references...	7
3 Terms and definitions...	8
4 Basic technical requirements...	9
5 Method for compiling the model of inlet valve...	13
6 Test methods...	13
7 Installation and operation...	15
8 Complete set supply scope...	16
9 Acceptance and guarantee...	16
19 Annex C (informative) Inlet valve spare parts...	21

1 Scope

GB/T 14478-2025 is the Chinese national standard on basic technical specification of inlet valves for large and medium-sized hydraulic turbines, 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 1 September 2025. Classification: ICS 27.140, CCS K55. 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 basic technical requirements and model compilation method for inlet valves for large and medium-sized hydraulic turbines. It describes the test methods. This document applies to the design, manufacture and acceptance of turbine inlet valves. butterfly valves with a nominal diameter of 1000 mm~10000 mm and ball valves with a nominal diameter of 500 mm~5000 mm. Other butterfly valves and ball valves (including storage pumps, water regulating pumps and pump-turbines) shall be implemented in accordance with this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 150 (all parts), Pressure vessels

GB/T 191, Packaging and storage marks

GB/T 2900.45, Electrotechnical terminology -- Hydroelectric powerplant machinery

GB/T 8564, Technical specification for installation of hydraulic turbine-generator unit

GB/T 9652.1, Specification of hydraulic turbine governing systems

GB/T 9652.2, Testing specification of hydraulic turbine governing systems

GB/T 15468-2020, Fundamental technical requirements for hydraulic turbines

GB/T 22581-2008, Fundamental technical requirements for Francis pump-turbines

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 2900.45 and GB/T 40582 as well as the followings apply.

3.1 nominal diameter of inlet valve; D The minimum inner diameter of the valve body where the inlet valve is connected to the upstream and downstream pressure water pipe flanges. NOTE. The unit is millimeter (mm). If the inner diameters on both sides are different, the smaller value shall be taken.

3.2 maximum static head; H_{st} After the inlet valve is closed, the water column height formed from the horizontal center line of the inlet valve to the normal water level upstream.

3.3 maximum static pressure; p_c After the inlet valve is closed, the water pressure formed from the horizontal center line of the inlet valve to the normal water level upstream.

3.4 maximum momentary pressure; $p_{m \max}$ The maximum gauge pressure generated at the horizontal center line of the inlet valve during the transition process. NOTE. The unit is megapascal (MPa).

3.5 design pressure; p_d The pressure used for strength design of flow-through parts of inlet valves of turbines.

4 Basic technical requirements

4.1 The design pressure of the inlet valve shall not be less than the maximum transient pressure. The design, manufacture and inspection of the inlet valve and the pressure-bearing parts of the piping system shall comply with the provisions of GB/T 150 (all parts),

4.2.1.21 of GB/T 15468-2020 and

4.2.1.21 of GB/T 22581-2008.

4.2 When the unit is shut down normally or under maintenance, the inlet valve shall be closed reliably.

4.6 When the pressure difference on both sides of the inlet valve is no more than 30% of the maximum static water pressure, it shall be opened normally.

4.7 The assembly of inlet valve shall be assembled at the manufacturer. After assembly and installation in the power station, it shall ensure flexible movement and accurate full open and full closed positions.

4.8 The following parts of the inlet valve structure shall be replaced without disassembling the valve body.

4.9 The butterfly valve seal shall be solid and set on the downstream side of the butterfly valve. The belt and the sealing seat shall have sufficient compression. If the butterfly valve seal adopts air belt seal, it is advisable to adopt a uniform standard cross-sectional size of 50 mm outer diameter and 30 mm inner diameter. The working air pressure of the belt shall be

0.1 MPa~

0.2 MPa higher than the maximum hydrostatic pressure. The maximum air pressure is allowed to be adjusted to

0.4 MPa higher than the maximum hydrostatic pressure.

4.17 The inlet valve shall be able to be operated automatically or manually.

4.18 The inlet valve shall be equipped with one or more of the following signal devices when clearly specified in the contract.

4.19 According to the actual use conditions of the inlet valve, the material of the inlet valve shall comply with the following requirements.

5 Method for compiling the model of inlet valve

The model compilation method of the inlet valve shall be in accordance with the provisions of Annex B.

6 Test methods

6.1 Inlet valve assembly test Usually according to the contract requirements, the inlet valve shall be subjected to the following tests after assembly in the manufacturing plant.

6.2 Relay assembly test When the operating mechanism of the inlet valve adopts a direct cylinder servo, the servo shall be subjected to the following tests after being assembled in

the equipment contractor's factory.

6.3 Requirements for valve watertight seal test and flaw detection When the design pressure is less than or equal to

0.6 MPa, the water sealing weld of the inlet valve shall be subjected to kerosene penetration test. It is required that no penetration shall occur. When the design pressure is greater than

0.6 MPa, magnetic particle or color flaw detection shall be performed.

6.4 Dynamic water shut-off test Before the dynamic water shut-off test of the inlet valve is carried out, a detailed test outline shall be formulated with the equipment contractor to ensure the safety of the test. After the dynamic water shut-off test, the inlet valve and its ancillary equipment shall be inspected according to the requirements of the test outline.

7 Installation and operation

7.1 During installation on site, the requirements of GB/T 8564 and the drawings and relevant technical documents of the equipment contractor shall be followed.

7.2 The oil, water and gas pipelines formed and welded on site shall be subjected to water pressure or oil pressure test. The test pressure shall be

1.5 times the design pressure of the corresponding pipeline and the test time shall be 30 min.

7.4 The operation shall be carried out strictly in accordance with the relevant technical documents and automated operation procedures. The inlet valve equipment and accessories shall be maintained regularly.

7.5 If hydraulic self-excited vibration occurs during the operation or maintenance of the ball valve, it can be eliminated by opening the bypass valve or inserting the maintenance sealing ring.

8 Complete set supply scope

8.1 The complete set of inlet valves operated by oil pressure or water pressure shall include.

8.2 Special tools and spare parts for installation, disassembly and maintenance of inlet valves.

8.3 The following technical documents shall be provided for each inlet valve.

9 Acceptance and guarantee

9.1 Inlet valve products and main components shall be inspected and qualified by the