



山東北辰

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CONTINUOUS BLOWDOWN EXPANSION TANK

Operation and Maintenance Instruction Manual

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1. Equipment Overview

1.1 Equipment Purpose and Principle

The continuous blowdown expansion vessel described in this manual is suitable for thermal power plants or other industries for the continuous blowdown of

boiler water or other high-pressure, high-temperature condensate separation.

Principle: High-temperature and high-pressure condensate enters the device through the condensate inlet and is evenly diffused by the internal vortex device; this allows for full separation of steam and water, with steam being discharged from the top to the deaerator or other steam-using devices for reuse. The condensate separated at the bottom of the device can be discharged to the blowdown expansion vessel or condensate tank. The condensate liquid level is controlled by a level control system to keep the water level within the control range.

1.2 Equipment Parameters

See the "Technical Characteristics Table" in the accompanying drawings.

1.3 Equipment Outline

See the accompanying drawings.

1.4 Attachments

- (1) Instruments: The equipment body is equipped with pressure measurement and temperature measurement ports.
- (2) Level Control: The equipment body has a magnetic float level gauge interface.
- (3) Safety: A safety valve is installed at the upper part of the equipment to prevent overpressure damage due to sudden increases in steam pressure.

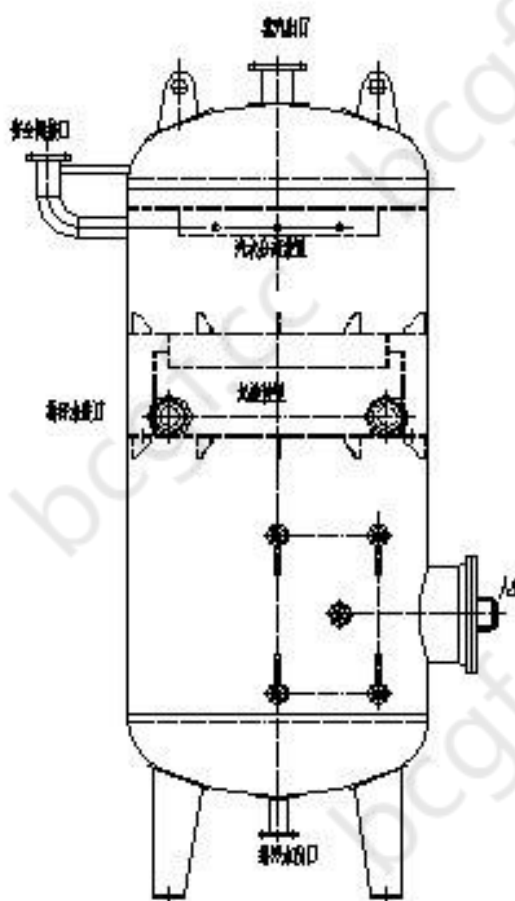
2. Equipment Description

2.1 Main Components of the Continuous Blowdown Expansion Vessel:

Cylinder, Support.

2.1.1 Cylinder

The cylinder is a structure with standard elliptical heads welded at both ends to the cylindrical section, with internal steam-water separation devices and vortex devices. External interfaces include blowdown water inlet and outlet, steam outlet, safety valve interface, manhole, etc. The structural schematic is as follows:



2.1.2 Support

The equipment is equipped with three A3-type supports (refer to JB/T4712.4-2007) to bear the weight of the equipment.

2.2 Factory Documentation

- a. Product qualification certificate;
- b. Quality certificate;
- c. Completion drawings;
- d. Installation, operation, maintenance, and user manual;
- e. Shipping list.

3. Installation

3.1 Pre-installation Inspection

- (1) Check whether the equipment shape meets the drawing requirements and whether there are any damages from transportation.
- (2) Check for rust at each interface that may affect sealing.
- (3) Check for looseness, rust, or stains on all fasteners.

3.2 Site and Foundation

- (1) Sufficient space should be left at both ends of the installation for disassembly and maintenance needs, based on the equipment's structural form.
- (2) The foundation dimensions should match the support dimensions; the foundation can be poured with concrete or constructed from steel. When using a concrete foundation, a base plate must be embedded on the foundation surface of the movable support, and the base plate must be kept flat and smooth.

3.3 Equipment Lifting

- (1) The equipment lifting must strictly follow the on-site operation specifications.
- (2) Pay attention to the center of gravity position when lifting the equipment.
- (3) Use lifting lugs if the equipment has them. If there are no lifting lugs, the equipment body or other safe methods must be used for lifting. At no time should components, lugs, or pipe connections be used to lift the equipment.

3.4 Equipment Positioning Installation

- (1) Place the equipment on the foundation, align it vertically, ensuring the centerline deviation is less than 5mm, and then tighten the nuts.
- (2) Movable supports with anchor bolts should be equipped with two locking nuts, leaving a gap of 1-3mm between the nuts and the base plate.
- (3) After installation, the movable or rolling support ends should not obstruct the thermal expansion of the equipment.
- (4) Connect the pipelines and fittings without applying force to the equipment, avoiding strong assembly.
- (5) Before trial operation, install valves and instruments according to the drawings and system control requirements.

4. Operation and Maintenance

4.1 The equipment must not operate beyond the conditions specified on the nameplate.

4.2 During operation, regularly check whether all valves and measuring

instruments are functioning properly and look for leaks; if any abnormalities are found, timely repairs or replacements should be made.

4.3 Continuously monitor the medium temperature, pressure, flow, and vibration conditions of the equipment during operation. If any anomalies are detected, analyze the causes promptly and carry out repairs and maintenance as necessary; maintenance must be conducted during downtime.

4.4 Regular Inspection

- a. The periodic inspection of the equipment should comply with the "Safety Technical Supervision Regulations for Fixed Pressure Vessels."
- b. External inspections and internal examinations should follow the provisions of the "Inspection Regulations for In-service Pressure Vessels" regarding content and safety status levels.
- c. Check if the safety valve, water level adjuster, and control valve are functioning properly.

5. Precautions:

5.1 When disassembling the equipment, if the gasket has been loosened, it must be replaced with a new one upon reassembly.

5.2 The liquid level must be strictly controlled and not exceed the maximum level.

5.3 The equipment can only be used after successful pressure testing upon installation.

5.4 Before using the equipment, open the bypass valve to drain any internal wastewater and rinse the equipment to ensure there are no particulate contaminants inside, then close the bypass valve and start normal operation.