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

GB/T 16508.7-2022

Replacing GB/T 16508.7-2013

Shell boilers - Part 7: Installation

锅壳锅炉 第7部分：安装

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1 Scope

GB/T 16508.7-2022 is the Chinese national standard on shell boilers - part 7: installation, 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 9 March 2022 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 October 2022. Classification: ICS 27.060.30, CCS J98. 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 requirements for installation, commissioning and acceptance of shell boilers. This document applies to shell boilers defined in GB/T 16508.1.

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 1576, Water quality for industrial boilers

GB/T 2900.48, Electrotechnical terminology of boilers

GB/T 12145, Quality criterion of water and steam for power plant and steam- generating equipment

GB/T 16508.1, Shell boilers - Part 1: General requirements

GB/T 16508.4, Shell boilers - Part 4: Fabrication, inspection and acceptance

GB/T 16508.6, Shell boilers - Part 6: Combustion systems

GB 50126, Code for construction of industrial equipment and pipeline insulation engineering

GB 50211, Code for construction and acceptance of industrial furnaces building

GB 50231, General code for construction and acceptance of mechanical equipment installation engineering

GB 50264, Code for design of industrial equipment and pipeline insulation engineering

GB 50273, Standard for construction and acceptance of boiler installation engineering

GB 50275, Code for construction and acceptance of fan, compressor and pump

a) There shall be no mechanical damage to the boiler shell, header surface and welded short pipe. Welds shall have no obvious defects such as cracks.

7.2 Installation of boiler shell, header and rear heating surface

7.2.1 The boiler shell shall be installed and fixed in the steel structure before it can be hoisted into place. For boiler shells directly supported by non-steel beams, firm temporary supports shall be installed. Temporary supports shall be removed before water is fed for the boiler hydrostatic test.

7.2.2 When the boiler shell and header are in place, the expansion gap of the support shall be reserved according to the expansion direction. It shall be temporarily fixed.

7.2.3 Carry out the following inspections when installing the internal devices of the boiler shell:

- a) The number of parts shall not be missing.
- b) The connection of steam and water supply connection partitions shall meet the requirements of technical documents.
- c) The flange joint surface shall be tight.
- d) The connection of the connectors shall be firm. There shall be an anti-loosening device.

7.2.4 After the boiler shell and header are installed, the center line of the boiler shell

7.4.1 Before expansion joint installation, the heating surface pipe meets the following requirements:

- a) There shall be no defects such as heavy skin, cracks, flattening and severe corrosion on the surface of the pipe.
- b) Alloy steel pipes shall be inspected one by one.
- c) Heating surface pipes shall be inspected and corrected for shape.
- d) The heating surface pipes shall be arranged neatly. The deviation between the local pipe section and the designed installation position shall meet the requirements of the drawing.
- e) The inclination of the end face of the expansion joint shall comply with the design drawings and technical documents.

7.4.8 Expand the pipe according to the requirements of

GB/T 16508.4, and meet the following requirements:

- a) After the pipe end is installed in the pipe hole, it shall be expanded immediately.
- b) After the reference pipe is fixed, it shall be expanded from the middle to both sides.
- c) Calculate the pipe expansion rate according to the inner diameter control method or the outer diameter control method. When using the inner diameter control method, the pipe expansion rate shall not exceed the range of 1.0%~2.1%. When using the outer diameter control method, the pipe expansion rate shall not exceed the range of 1.0%~1.8%.

7.5 Hydrostatic test

7.5.1 During boiler installation, the pressure elements shall undergo hydrostatic test after non-destructive testing and heat treatment.

7.5.2 After the installation of the pressurized steam and water system of the boiler and its accessories is completed, a hydraulic test shall be carried out. Before installation of cast

iron economizers, it is advisable to carry out hydrostatic test one by one (or group).

7.5.3 The main steam valve, water outlet valve, blowdown valve and feed water shut-off valve shall be subjected to hydrostatic test together with the boiler. The safety valve shall be subjected to pressure test independently.

7.5.4 Carry out the following checks before the hydrostatic test.

- a) Internal cleaning and surface inspection shall be carried out for pressure components (elements) such as boiler shells and headers.
- b) Water cooling walls, convection pipe bundles and other pipes shall be kept unblocked.
- c) There shall be no less than 2 pressure gauges installed. For boilers with rated working pressure less than

2.5 MPa, the accuracy level of the pressure gauge shall not be lower than 2.5. For boilers with a rated working pressure of not less than

2.5 MPa, the accuracy level of the pressure gauge shall not be lower than 1.6. The pressure gauge shall be calibrated as qualified. The range of the dial shall be

1.5 to 3 times the test pressure, preferably 2 times.

- d) Install drainage pipes at the lowest point of the system. Install a vent valve at the highest point of the system.

7.5.5 During the installation process of the boiler, the hydraulic pressure test of the requirements:

- a) The materials, elements and manufacture of pressure piping shall meet the requirements of relevant manufacturing supervision and inspection of boiler components.
- b) The opening of pressure piping and equipment shall meet the requirements of design drawings and process documents.

9.2 Burner installation

9.2.1 Matching burners shall meet the requirements of technical documents. Product technology, quality, and environmental certification materials shall be complete.

9.2.2 The reserved burner installation position shall be correct. Prevent the flame from directly scouring the surrounding heating surface.

9.2.3 Before the burner is installed, the overall dimensions of the burner shall be checked. The installation of the burner shall meet the requirements of technical documents, product instructions and GB/T 16508.6.

10 Furnace wall masonry and insulation layer construction