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NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 47003.1-2022

Replacing NB/T 47003.1-2009

**Atmospheric pressure vessels - Part 1: Steel welded
atmospheric pressure vessels**

常压容器 第1部分：钢制焊接常压容器

Issued on: November 4, 2022

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Foreword

This document was issued on 4 November 2022 by the National Energy Administration of the PRC and takes effect on 4 May 2023.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 23.020.10, Chinese classification J 74.

It replaces NB/T 47003.1-2009, which is superseded.

This document has been drafted in accordance with the rules given in GB/T 1.1-2020, Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

NB/T 47003, Atmospheric pressure vessels, is divided into two parts.

Part 1: Steel welded atmospheric pressure vessels.

Part 2: Solid material silos.

This document constitutes Part 1 of NB/T 47003, Atmospheric pressure vessels.

This document supersedes NB/T 47003.1-2009, Steel welded atmospheric pressure

vessels. In addition to structural adjustments and editorial changes, the following main technical changes have been made with respect to NB/T 47003.1-2009.

- a) The range of application of the vessels covered has been changed (see 1.2 and 1.3; 1.2 of the 2009 edition), together with the range of exclusions (see 1.4; 1.3 of the 2009 edition).
- b) The requirement covering the responsibilities of the user or of the party commissioning the design has been added (see 4.2.1).
- c) The safety factors for carbon steel, low-alloy steel and high-alloy steel have been changed: the safety factor applied to the lower limit of the tensile strength specified in the steel product standard has been adjusted from 2.4 to 2.3 (see 4.4; 4.6 of the 2009 edition).
- d) The combined gas and liquid test has been added (see 4.6).
- e) Steel grades and the allowable stresses of sections (structural shapes) have been added (see Clause 5; Clause 5 of the 2009 edition).
- f) The applicable range of openings has been changed (see 6.4.2; 6.5.3 of the 2009 edition).
- g) The former Annex A, Properties of steels at different temperatures, has been deleted (see Annex A of the 2009 edition) and a new Annex A, Alternative design method for the structure at the junction between the cylinder and the head, has been added (see Annex A).
- h) Annex B, Calculation of local shell stresses at the support attachment, has been added (see Annex B).

This document has been proposed by and is under the jurisdiction of the National Technical Committee on Boilers and Pressure Vessels of Standardization Administration of China (SAC/TC 262).

The previous editions of this document and of the documents it supersedes were issued as follows.

JB 2880-1981.

JB/T 4735-1997.

NB/T 47003.1-2009.

Identification and publication data

Standard designation: NB/T 47003.1-2022.

Chinese title: Chang ya rong qi - Di 1 bu fen: Gang zhi han jie chang ya rong qi.

English title as printed on the cover: Atmospheric pressure vessels - Part 1: Steel welded atmospheric pressure vessels.

Classification: ICS 23.020.10; CCS J 74.

Standard level: energy industry standard of the People's Republic of China (NB/T series), recommended (voluntary) standard.

Issuing authority: National Energy Administration of the People's Republic of China.

Date of issue: 4 November 2022.

Date of implementation: 4 May 2023.

Superseded standard: NB/T 47003.1-2009.

The standard was approved together with NB/T 47003.2-2022 and published in the combined volume NB/T 47003.1 to 47003.2-2022, which supersedes NB/T 47003.1 to 47003.2-2009.

The document was released by Announcement No. 5 of 2022 of the National Energy Administration, dated 4 November 2022, which approved 237 energy industry standards together with 15 foreign-language versions of energy industry standards.

The publishing body listed in the announcement catalogue is Beijing Science and Technology Publishing House (Beijing Kexue Jishu Chubanshe).

In the announcement catalogue, NB/T 47003.1-2022 appears as item 85, with an approval date of 4 November 2022 and an implementation date of 4 May 2023.

Structure of the NB/T 47003 series

NB/T 47003, Atmospheric pressure vessels, is published as a series in two parts.

Part 1, Steel welded atmospheric pressure vessels, is the present document; it covers the design, fabrication, inspection and acceptance of welded vessels made of steel and operating at atmospheric pressure.

Part 2, Solid material silos, is published as NB/T 47003.2-2022 and supersedes NB/T 47003.2-2009.

Both parts were approved on the same date, 4 November 2022, and entered into force on the same date, 4 May 2023.

In the combined volume, Part 1 begins on page 1 and its explanation of drafting on page 109, while Part 2 begins on page 115 and its explanation of drafting on page 183.

The lineage of the present part runs from JB 2880-1981 through JB/T 4735-1997 and NB/T 47003.1-2009 to the present edition.

Contents of the document

The body of the document is organised in nine clauses followed by two informative annexes

and an explanation of the drafting of the standard.

The Foreword begins on page 4.

Clause 1, Scope, begins on page 5.

Clause 2, Normative references, begins on page 5.

Clause 3, Terms and definitions, begins on page 7.

Clause 4, General requirements, begins on page 9; it includes the responsibilities of the user or of the party commissioning the design (4.2.1), the safety factors applied to the material properties (4.4) and the combined gas and liquid test (4.6).

Clause 5, Materials, begins on page 15 and gives the steel grades and the allowable stresses of plates and sections.

Clause 6, Basic structural elements, begins on page 23 and includes the applicable range of openings (6.4.2).

Clause 7, Cylindrical vessels, begins on page 44.

Clause 8, Rectangular vessels, begins on page 65.

Clause 9, Fabrication, inspection and acceptance, begins on page 82.

Annex A (informative), Alternative design method for the structure at the junction between the cylinder and the head, begins on page 93.

Annex B (informative), Calculation of local shell stresses at the support attachment, begins on page 103.

The explanation of the drafting of the standard begins on page 109.

The clause numbering of the 2009 edition is cross-referenced in the Foreword for each of the main technical changes, so that users of the previous edition can locate the corresponding requirements.

Main technical changes with respect to the 2009 edition

The range of application of the vessels has been revised: the scope of application is now set out in 1.2 and 1.3, in place of 1.2 of the 2009 edition.

The range of exclusions has been moved and revised: it is now given in 1.4, in place of 1.3 of the 2009 edition.

A new requirement on the responsibilities of the user or of the party commissioning the design has been introduced in 4.2.1.

The safety factors for carbon steel, low-alloy steel and high-alloy steel have been revised.