

NB

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

中华人民共和国行业标准

NB/T 47041-2014 (JB/T 4710)

NB/T 47042-2014 (JB/T 4731)

**Vertical vessels supported by skirt
Horizontal vessels on saddle supports**

塔式容器

卧式容器

Issued on June 29, 2014

Implemented on November 01, 2014

Issued by the National Energy Administration

National Energy Administration

Announcement

2014 No.4

In accordance with the provisions in “Notice on Issuing ‘Energy Industry Standardization Management Method’ and Detailed Rules issued by National Energy Administration (Trial)” (National Energy Administration Technology [2009] No. 52), National Energy Administration approves “Physical and Chemical Testing Methods Nuclear Island Mechanical Equipments and Materials of Nuclear Power Plan” and other standards upon examination (see annex), totally 164 industry standards including 158 energy standards (NB) and 6 electricity standards (DL), which are hereby released.

Annex: Industry standard directory

June 29, 2014

Annex

Industry Standard Directory

No.	Standard No.	Standard Name	Replacing Standard	Adopted Standard No.	Approval Date	Implementation Date
1~126	(Omitted)					
127	NB/T 47041—2014 (JB/T 4710)	Vertical vessels supported by skirt	JB/T 4710—2005		June 29, 2014	November 1, 2014
128	NB/T 47042—2014 (JB/T 4731)	Horizontal vessels on saddle supports	JB/T 4731—2005		June 29, 2014	November 1, 2014
129	NB/T 47043—2014 (JB/T 1620)	Technical specification for manufacture of boiler steel structure	JB/T 1620—2005		June 29, 2014	November 1, 2014
130	NB/T 47044—2014 (JB/T 3595)	Power station valve	JB/T 3595—2005		June 29, 2014	November 1, 2014
131~164	(Omitted)					

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Foreword

This standard is drafted in accordance with provisions in part 1 of GB/T 1.1—2009 “Directives for standardization”—Part 1:Structure and drafting of standards.

This standard draws the advanced content of similar international standards, combines with changes in relevant regulations and standards and is the enriched and improved based on experience since implementation of JB/T 4710—2005 “Steel Vertical Vessels Supported by Skirt”.

Compared with JB/T 4710—2005, main changes of the standard are as follows:

Revise relevant contents in accordance with TSGR0004—2009 “Supervision Regulation on Safety Technology for Stationary Pressure Vessel”;

Revise relevant contents in accordance with GB 150.1~150.4—2011 “Pressure Vessels”;

Increase technical requirements for puncture test;

——Bring calculation of wind vibration in cross-wind direction to text;

——Increase requirements for materials of connecting tower body and skirt;

——Increase declaration of conformity;

——Increase seismic load base shear method;.

This standard is proposed and under the jurisdiction of China Standardization Committee on Boilers and Pressure Vessels (SAC/TC 262).

Drafting units of this standard: Lanpec Technologies Limited, China Special Equipment Inspection and Research Institute, Sinopec Ningbo Engineering Co., Ltd., Sinopec Engineering Incorporation, Tianjin University, Tianjin Guanjie Petrochemical Engineering Co., Ltd., Shanghai Institute of Special Equipment Inspection and Technology.

Main drafters of this standard: Zhang Yanfeng, Yang Guoyi, Wang Zhexiang, Chen Zhiwei, Song Qixiang, Feng Xiaoqing, Duan Xinquan, Tian Ying, Nie Qingde, Tan Wei, Xie Peijun, Chao Zhaohui, Liu Fulu, Luo Xiaoming, Zhou Wenxue, Chen Siwen.

Previous versions that this standard replaces are as follows:

——JB/T 4710—1992;

——JB/T 4710—2005.

Introduction

This standard is one of technical standards prepared and under the jurisdiction of China Standardization Committee on Boilers and Pressure Vessels (hereinafter referred to as the "Committee") and used to standardize related technical requirements for design, manufacture, inspection and acceptance of vertical vessels supported by skirt used in China.

Technical provisions of this standard include recommended clauses that shall be followed during construction process of vertical vessels supported by skirt (i.e. design, manufacture, inspection and acceptance). It is unnecessary and impossible for the standard to include all technical details of vertical vessels supported by skirt within the scope of application, so technical contents that are not specifically mentioned in this standard shall not be forbidden under the premise of meeting all basic safety requirements specified in this standard. This standard may not serve as a technical manual of specific vertical vessels supported by skirt construction or substitute training, work experience and engineering judgment. Engineering evaluation refers to technical evaluation for specific products made by technical personnel, who are knowledgeable and can properly apply specification. Once this standard is adopted for engineering application, the engineering application shall comply with relevant technical requirements of this standard and may not violate forbidden provisions in this standard.

This standard does not limit the adoption of advanced technology and methods used in actual project design and construction, but engineering technical personnel shall be able to make reliable judgments for advanced technology and methods to ensure that they meet provisions of this standard, especially design specifications on strength, stability calculation formula, etc.

Technical methods and technical requirements do not involve any patents. However, it shall be noted that engineering application of this standard may involve specific patents and issuing organization of this standard does not assume any responsibility for the identification of these patents.

This standard neither requires nor prohibits design personnel to use a computer program to analyze or design pressure vessels. However, when a computer program is adopted,

besides meeting requirements of this standard, following aspects shall be confirmed:

- 1) Rationality of technical assumption in adopted program;
- 2) Adaptability of adopted program to design contents;
- 3) Correctness of input parameters and output results of adopted program used in engineering design.

Inquiry for standard technical provisions shall be submitted to the Secretariat of the Committee in written form and it is the obligation to provide required information. Inquiries that has no direct relationship with the standard provisions or cannot be understood will be considered technical consultation and the Committee has the right to refuse to answer.

For ambiguity on understanding due to publicity and interpretation by the organizations that are not authorized or recognized by the Committee and resulting consequences, the Committee will not assume any responsibility.

Vertical Vessels Supported by Skirt

1 Scope

1.1 This standard specifies requirements for design, manufacture, inspection and acceptance of metal vertical vessels supported by skirt, etc.

1.2 Application scope of this standard is as follows:

- a) Design pressure of steel vertical vessels shall not be greater than 35Mpa; design pressure of vertical vessels made from other materials is based on relevant standards;
- b) Design temperature range is based on allowable operating temperature range of metal materials;
- c) Skirt self-supporting metal vertical vessels that ratio of height H to average diameter D is greater than 5.

1.3 For skirt self-supporting metal vertical vessels that ratio of height H to average diameter D is no greater than 5, refer to annex E for design.

1.4 This standard does not apply to following vertical vessels supported by skirt:

- a) Vertical vessels supported by skirt that have pulling device;
- b) Vertical vessels in row or group integrated by operating platform;
- c) Vertical vessels supported by skirt with a jacket;
- d) Vertical vessels supported by skirt made of cast iron or non-metallic material.

2 Normative references

The articles contained in the following documents have become this document when they are quoted herein. For the dated documents so quoted, all the modifications (including all corrections) or revisions made thereafter shall be applicable to this document.

GB 150.1 Pressure vessels—Part 1: General requirements

GB 150.2 Pressure vessels—Part 2: Materials

GB 150.3 Pressure vessels—Part 3: Design

GB 150.4 Pressure vessels—Part 4: Fabrication, inspection and testing, and acceptance

GB/T 700 Carbon structural steels

GB/T 1591 High strength low alloy structural steels

GB/T 26929 Terminology for pressure vessels

GB 50009 (Edition 2006) Load code for the design of building structures

GB 50011-2010 Code for seismic design of buildings

JB/T 4730.1 Nondestructive testing for pressure equipment - Part 1: general requirements

JB/T 4730.2 Nondestructive testing of pressure equipments-Part 2: Radiographic testing

JB/T 4730.3 Nondestructive testing of pressure equipments-Part 3: Ultrasonic testing

JB/T 4730.4 Nondestructive testing of pressure equipments -Part 4: Magnetic particle testing

JB/T 4730.5 Nondestructive testing of pressure equipments-Part 5: Penetrant testing

JB/T 4730.6 Nondestructive testing of pressure equipments-Part 6: Eddy current testing

JB/T 4734 Aluminium welded vessels

JB/T 4745 Titanium welded vessels

JB/T 4755 Copper pressure vessels

JB/T 4756 Nickel and nickel alloy pressure vessels

NB/T 47002 (All parts) Explosion welded clad plate for pressure vessels

NB/T 47011 Zirconium pressure vessels

TSG R0001 Nonmetal Pressure Vessels Safety and Technical Supervision Regulation

3 Terms and definitions

Following terms and definitions defined in GB/T 26929 apply to this standard.

3.1

Pressure

Force directly on unit surface area of vertical vessels supported by skirt. In this standard, all pressures refer to surface pressure unless otherwise indicated.

3.2

Operating pressure

Maximum pressure on top of vertical vessels supported by skirt under normal operating conditions.

3.3

Design pressure

Maximum design pressure on top of vertical vessels together with corresponding design temperature is basic design load conditions of vertical vessels supported by skirt.

3.4

Calculation pressure

Pressure used to determine the thickness of vertical vessels supported by skirt, including static pressure of liquid column and other additional loads.

3.5

Test pressure

Pressure on top of vertical vessels when puncture test or leak test is conducted.

3.6

Maximum allowable operating pressure (MAWP)

Maximum pressure on top of vertical vessels supported by skirt at specified corresponding temperature. This pressure is based on maximum effective pressure on this component, calculated by taking into account of all loads on this component and the minimum value.

Note: if design document of vertical vessel supported by skirt does not provide maximum allowable operating pressure, design pressure of this vessel is considered maximum allowable operating pressure.

3.7

Design temperature

Design metal temperature of component (average temperature along metallic cross section of component) under normal working conditions of vertical vessels supported by skirt. Design temperature along with design pressure are design load conditions.

3.8

Test temperature

Shell metal temperature of vertical vessels supported by skirt when puncture test or leak test is carried out.

3.9

Required thickness

The thickness calculated in accordance with corresponding formula in this standard. Necessary thickness of other loads shall also be included in if necessary (see 4.2.4). It

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