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

GB/T 16749-2018

Replacing GB/T 16749-1997

Bellows expansion joints for pressure vessel

压力容器波形膨胀节

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 16749-1997 "Pressure Expansion of Pressure Vessels". Compared with GB/T 16749-1997, except for editorial repair The main technical changes changed are as follows:

a) Expanded the scope of application of the standard.

--- Incorporate a wave expansion joint of non-ferrous metal materials by reference to standards (see Chapters 2, 4.1.2, 6.2.1 and 6.2.4);

--- Increased waveform and structure of the waveform expansion joint, improved design parameters, and expanded the scope of application of the standard (see 1.2 and 5.1, 1997 editions 1.2,

b) Revised or added provisions for design calculation and thickness limits for waveform expansion joints.

--- Revised design calculations for unreinforced U-shaped single or multi-layer bellows and with straight-edged wave expansion joints (see Chapter 7,.1997) Chapter 6 of the annual edition);

--- Increased U-shaped, Omega-shaped single or multi-layer bellows design calculations (see Chapter 7);

--- Increased the classification of welded joints of wave expansion joints and the high temperature strength reduction coefficient of welded joints (see

4.3.1 and 4.3.3);

--- Increased the requirement for the axial displacement (axial or axial compression) of the bellows geometry (see 7.8.1);

--- Increased the waveform structure and thickness range requirements of the pressure vessel expansion joint (see

c) Revised the requirements for manufacturing, testing and acceptance of wave expansion joints.

1 Scope

GB/T 16749-2018 is the Chinese national standard on bellows expansion joints for pressure vessel, in the field of fluid systems and general-purpose components. 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 17 September 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 April 2019. Classification: ICS 23.020.30, CCS J74. 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.

1.1 This standard specifies the terms and definitions, general requirements, classification and marking of the pressure vessel expansion joint (hereinafter referred to as the wave expansion joint). Materials, design, manufacturing, inspection and acceptance, inspection rules, factory requirements, storage and installation.

1.2 The pressure vessel wave expansion joints specified in this standard are applicable to.

a) The pressure vessel is a single-layer or multi-layer wave expansion joint that is not reinforced U-shaped, reinforced U-shaped or Omega-shaped, and is subjected to internal

pressure or external pressure, wherein The bellows complies with the provisions of 7.2.1.

b) The design pressure is not more than 12 MPa.

c) The design temperature applies to the following conditions. 1) The steel does not exceed the allowable temperature range of the materials listed in GB/T 150.2-2011; 2) Other metal materials are determined according to the permissible temperature of the materials listed in the corresponding reference standards.

d) The nominal diameter is not more than 4000mm.

e) The product of design pressure (MPa) and nominal diameter (mm) is not more than 2.7×10^4 .

1.3 Wave expansion joints beyond the range of

1.2 can be manufactured by reference to this standard.

1.4 This standard does not apply to the following waveform expansion sections.

a) a wave expansion joint for direct flame heating;

b) non-metallic waveform expansion joints;

c) A wave expansion joint in the nuclear power plant where there is a risk of neutron radiation damage failure.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 150-2011 (all parts) pressure vessel

GB/T 713 steel plate for boiler and pressure vessel

GB/T 985.1 Recommended groove for gas welding, electrode arc welding, gas shielded welding and high energy beam welding

GB/T 985.2 recommended groove for submerged arc welding

GB/T 1800.1-2009 Geometrical Product Specifications (GPS) Limits and fits. Part 1. Tolerances, deviations and fits basis

GB/T 1800.2-2009 Geometrical Product Specifications (GPS) Limits and fits. Part 2. Standard tolerance classes and Limit deviation table

GB/T 3098.1 Fastener mechanical properties bolts, screws and studs

GB/T 3098.2 fastener mechanical properties nut

GB/T 3098.6 Mechanical properties of fasteners Stainless steel bolts, screws and studs

GB/T 3274 carbon structural steel and low alloy structural steel hot rolled steel sheet and strip

GB/T 3280 stainless steel cold rolled steel plate and strip

GB/T 3621 titanium and titanium alloy sheet

GB/T 3880 (all parts) General industrial aluminum and aluminum alloy sheets, strips

3 Terms and definitions

The following terms and definitions as defined in GB/T 150-2011 apply to this document.

3.1 Nominal diameter nominal diameter DN It is expressed in the diameter of the container cylinder and is divided into two series: inner and outer diameter. It consists of the letter DN and the dimensionless integer number, which represents the specifications of the bellows.

Note 1. The rolled and forged end pipe (cylinder) has the inner diameter (mm) as the nominal diameter of the bellows.

Note 2. Pipe end pipe (cylinder), the outer diameter (mm) is used as the nominal diameter of the bellows.

3.2 Bellows bellows The flexible element of the wave expansion joint consists of one or several identical corrugations and straight sections.

3.3 Ripple convolution The smallest flexible unit of the bellows.

3.4 End straight section There is no corrugated part at the end of the bellows, that is, a straight tube that does not wave.

3.5 Expansion joint expansion joints A pressure-receiving device containing a bellows for absorbing dimensional changes such as equipment (or piping) caused by thermal expansion and contraction.

3.6 Reinforcement piece A component used to reinforce U-shaped and omega-shaped bellows to enhance the pressure resistance of the bellows.

Note. The reinforcement consists of a reinforcement ring (3.7) and an equalization ring (3.8).

3.7 Reinforced ring reinforcement rings It is installed on the corrugated root of the bellows and is made of pipe or bar to enhance the pressure resistance of the bellows.

3.8 Equilibrium ring equalizing rings It has a "T"-shaped cross-section and is located in the bellows (peak) of the bellows.

3.9 Hoop collars A cylinder or ring used to reinforce the straight section of the bellows and