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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 12777-2019

Replacing GB/T 12777-2008

General specification for metal bellows expansion joints

金属波纹管膨胀节通用技术条件

Issued on: May 10, 2019 **Implemented on: December 1, 2019**

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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 12777-2008 "General Technical Requirements for Metal Bellows Expansion Joints". This standard and GB/T 12777- Compared with.2008, the main technical changes are as follows:

---Modified the scope of application of the standard (see Chapter 1, Chapter 1 of the.2008 edition);

---Modified the normative references (see Chapter 2, Chapter 2 of the.2008 edition);

---Modified terms and definitions (see Chapter 3, Chapter 3 of the.2008 edition);

---Modified the classification of expansion joints (see 4.1.1,

4.1.1 of the.2008 edition);

---Modified the type classification of expansion joints (see 4.1.2,

4.1.2 of the.2008 edition);

---The classification of expansion joints according to restraint pressure thrust has been added (see 4.1.2);

---The component classification of expansion joints has been added (see 4.1.3);

---Added welding joint classification, welding joint coefficient and welding requirements (see 4.1.4,

---Modified the model representation method and marking examples (see

4.2.1 and 4.2.2,

4.2.2 of the.2008 edition);

1 Scope

China's national general specification for metal bellows expansion joints - the corrugated metal elements installed in pipework and ducting to absorb thermal movement, misalignment and vibration. A pipe carrying hot fluid grows, and if it is restrained it develops forces large enough to pull an anchor out of a structure or a nozzle off a vessel; the expansion joint is what accommodates the growth instead. It is also, and this is the point of the standard, the most highly stressed component in the system: it is deliberately thin so that it can flex, it is cycled through its full movement every time the plant starts and stops, and it is the one element with no margin left over. This document specifies the general technical conditions for metal bellows expansion joints, covering the materials, the design, the manufacture, the inspection and testing, the marking, packaging and transport, and the requirements for ordering. The design clauses are the substance of it: the calculation of the bellows for internal pressure and for the movement it must absorb, the fatigue life expressed as a number of cycles at the specified movement - which is the figure the whole selection turns on, since a bellows does not fail from pressure but from fatigue after a countable number of cycles - the stability against squirm, which is the buckling mode peculiar to bellows and the one that occurs without warning, and the design of the end fittings, the tie rods, the hinges and the gimbals that determine what movements the joint accepts and what forces it transmits to the anchors. The manufacture and inspection clauses cover the forming of the convolutions, the longitudinal weld in the tube from which

they are made, the heat treatment, and the examination and pressure testing. Issued on 10 May 2019 and in force since 1 December 2019, it replaces GB/T 12777-2008.

This standard specifies the terms and definitions, classification and marking, materials, dimensions and deviations of metal bellows expansion joints (hereinafter referred to as "expansion joints") Poor, design, manufacture, inspection and testing, inspection rules, marking, packaging, transportation and storage, selection, installation and use requirements and safety recommendations. This standard applies to the design, manufacture, inspection, selection, installation and use of expansion joints installed in pipelines whose flexible elements are metal bellows. The expansion joints in other occasions can be used as reference.

2 Normative references

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

GB/T 150.3-2011 Pressure Vessel Part

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Bellows expansion joint Composed of one or several corrugated pipes and structural parts, used to absorb the dimensional changes of pipes and (or) equipment caused by thermal expansion and contraction.

3.2 Round bellows In the expansion joint, a circular flexible element composed of one or more circular corrugations and straight end sections. For reinforced U-shaped bellows and Omega Shaped bellows, including strengthening ring and equalizing ring.

3.3 Rectangular bellows In the expansion joint, a rectangular flexible element composed of one or more rectangular corrugations and straight end sections.

3.4 Single axial expansion joint Composed of a bellows and structural parts, it is mainly used for the expansion joints that absorb axial displacement and cannot bear the pressure thrust of the bellows.

3.5 External pressure axial expansion joint Composed of structural parts such as bellows that bear external pressure, outer pipes and end rings, which are mainly used to absorb axial displacement and cannot bear the pressure of bellows Expansion joints for thrust.

4.1 Classification

4.1.1 Classification of expansion joints Expansion joints are divided into three types