



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

GB/T 150.3-2024

Replacing GB/T 150.3-2011

Pressure vessels - Part 3: Design

压力容器 第3部分：设计

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document is Part 3 of GB/T 150 "Pressure vessels". GB/T 150 has published the following parts:

- Part 4: Fabrication, inspection and testing, and acceptance.

This document replaces GB/T 150.3-2011 "Pressure vessels - Part 3: Design". Compared with GB/T 150.3-2011, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) ADD "General provisions" for pressure vessels (see Chapter 4);
internal pressure cylinders (see 5.3; 3.3 of the 2011 edition);
- d) CHANGE the external pressure stress coefficient B curve and data table (see Table e)
ADD the external pressure stress coefficient B curve and data table (see Figure 6- f)
CHANGE the marking of Figure 6-12 (see Figure 6-12; Figure 4-12 of the 2011 edition);
- g) ADD the cross-sectional dimension requirements of the reinforcement ring structure (see 6.5.2.6);
- h) ADD the buckling criteria and design method for preventing buckling of internal pressure elliptical heads and dished heads (see 7.3.2.2 and 7.3.2.3; 7.4.2.2 and 7.4.2.3);
conical head (see Table 7-4; Table 5-4 of the 2011 edition);
pressure non-folded conical shell and the cylinder (see 7.6.4; 5.6.4 of the 2011 edition);
and the cylinder without folding edge under the combined action of internal pressure and axial load (see Table 7-5; Table 5-5 of the 2011 edition); ADD the calculation of the reinforcement area when the small end of the conical shell is connected with rigid components such as flanges and flat covers (see 7.6.4.3.3 and 7.6.6.5.1d);
between the conical shell and the cylinder" (see Figure 7-20; Figure 5-18 of the 2011 edition);
- n) CHANGE the structural characteristic coefficient K of some flat covers (See Table 7-9; Table 5-9 of the 2011 edition); CHANGE the logarithmic coordinates of the structural characteristic coefficient curve diagram (plastic analysis design method) to ordinary coordinates (see Figures 7-23 and 7-24; Figures 5-21 and 5-22 of the 2011 edition);
- o) ADD the thickness calculation method of reinforced circular flat cover for wide flange (see 7.9.5b);
- q) CHANGE the design requirements for multiple openings on the flat cover (see r)

CHANGE the relevant data in the "Basic sealing width of gasket" table (see Table s) ADD the relevant parameters and calculation requirements of commonly used gaskets (see Table 9-2; Table 7-2 of the 2011 edition);

t) ADD the parameters of reverse flange (see Figure 9-9);

u) ADD the relevant content of symmetrical rectangular cross-section vessels with no reinforcement under external pressure (see Figure A.1 and Figure A.2);

v) ADD the symmetrical rectangular cross-section vessels with non-uniform bracing reinforcement (see Figure A.14);

inner tube to the nominal thickness of the steel ribbon wrapped tube, from 1/8 to 1/10 (see B.4.1; B.4.1 of the 2011 edition);

"Octagonal gasket and elliptical gasket series structural dimensions" to "Most commonly used pipe flange standards and octagonal gasket and elliptical gasket standard comparison table" (see C.6.2, Table C.7; C.6.2, Table C.7 of the 2011 edition);

aa) ADD two types of welding joints between non-reinforced pipes and cylinders in Figure D.4i), as well as the connection between embedded pipes and shells in Figure D.6c) [see Figure D.4i) and Figure D.6c)];

ab) ADD two types of connection structures between skirts and heads of Figure D.14e) and Figure D.14f) [see Figure D.14e), f)] ac) CHANGE the relevant requirements for vessels

with a design temperature below

-20 °C; ADD the technical requirements for chromium-nickel austenitic stainless steel vessels with a design temperature below -196 °C; CHANGE the design requirements for low temperature and low stress conditions (see Appendix E; Appendix E of the 2011 edition);

ad) ADD the "Verification method of pressure vessel to prevent low temperature brittle fracture" (see Appendix F);

ae) ADD the "Basic requirements for jacketed vessels" (see Appendix G).

This document was proposed by AND shall be under the jurisdiction of the National Technical Committee for Standardization of Boiler and Pressure Vessels (SAC/TC 262).

Please note that some contents of this document may involve patents. The issuing agency of this document does not assume the responsibility for identifying patents.

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This document was first issued in 1989. It was revised for the first time in 1998. It was revised for the second time in 2011. This is the third revision.

Introduction

Pressure vessels are one of the special equipment involving public safety, which are important equipment in the fields of petrochemicals, energy equipment, biomedicine, etc. In order to improve the economy and safety of pressure vessels, China issued the "Design regulations for steel chemical vessels" in 1967, GB 150 "Steel pressure vessels" in 1989; GB 150 was revised in 1998, as a supporting standard for pressure vessel regulations, which regulates the construction requirements of steel pressure vessels. The GB/T 150 series of standards has been issued and implemented for more than ten years since 2011. During this period, the "Regulations on safety technical supervision of stationary pressure vessels" was revised in 2016; the materials, components, non-destructive testing standards cited were also revised. In view of this, it is necessary to revise and improve GB/T 150, to continuously adapt to the new demands of economic development for this standard and better promote the highquality development of pressure vessel products.

This document is one of the general technical standards for pressure vessel construction methods, which is used to regulate the relevant technical requirements for the design, fabrication, inspection and acceptance of pressure vessels built or used in China. GB/T 150 "Pressure vessels" consists of four parts.

- Part 1: General requirements. The purpose is to give the basic requirements for the fabrication of pressure vessels.
- Part 2: Materials. The purpose is to provide the basic requirements for the selection of pressure vessels and the material data used in the design and fabrication process.
- Part 3: Design. The purpose is to provide the design method and design technical requirements of pressure vessels.
- Part 4: Fabrication, inspection and testing, and acceptance. The purpose is to provide the requirements in the fabrication process of pressure vessels and the inspection and acceptance requirements.

The technical provisions of this document include the technical requirements to be followed in the pressure vessel construction process (i.e., design, fabrication, inspection and acceptance). This document does not need to, nor can it, cover all the technical details of the pressure vessel construction within the applicable scope.

This document does not restrict the use of advanced technical methods in actual