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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 150.4-2024

Replacing GB/T 150.4-2011

Pressure vessels - Part 4: Fabrication, inspection and testing, and acceptance

压力容器 第 4 部分：制造、检验和验收

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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 4 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 150.4-2011 "Pressure vessels - Part 4: Fabrication, inspection and testing, and acceptance". Compared with GB/T 150.4-2011, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) CHANGE the scope of application (see Chapter 1; 1.2 of the 2011 edition).

1) CHANGE the definition of thickness of steel material (see 3.6; 3.6 of the 2011 edition);

2) ADD the terms such as forming temperature, thermal treatment, minimum thermal treatment, maximum thermal treatment, minimum postweld heat treatment, maximum postweld heat treatment, intermediate stress relief, pressure vessel designed by simple fatigue analysis, weld metal replacement (see 3.9 ~ 3.17).

1) ADD the requirements for raw materials (including welding materials) used in the fabrication of pressure vessels (see 4.3.1);

2) ADD the requirements for parts and components (including self-made, outsourced and purchased parts and components) used in the fabrication of pressure vessels (see 4.3.2);

3) ADD the requirements for the fabrication environment of high-alloy steel pressure vessels and non-ferrous metal lining parts (see 4.4);

4) CHANGE the provisions for risk prevention and control in the pressure vessel fabrication process (see 4.5; 4.2 of the 2011 edition).

1) DELETE the requirement that the chromium-nickel austenitic stainless steel plate used to fabricate the main pressure-bearing components shall be re-tested [see 5.1.1 d) of the 2011 edition];

2) ADD the requirement for re-testing of welding materials (see 5.1.2);

3) ADD the requirement for the segmentation of composite plate materials (see 5.2.2);

1) ADD the provisions for handling when the thickness of steel jumps (see 6.1.1);

3) ADD the provisions for grinding depth of cladding layer and coating layer included in strength (see 6.2.2);

4) ADD the provisions for grinding tools (see 6.2.3);

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5) CHANGE the provisions for non-destructive testing methods of steel welding groove surface (see 6.3; 6.3 of the 2011 edition);

6) ADD the relevant provisions for the head without top round plate that is formed by splitting and then assembled (see 6.4.2);

7) CHANGE the provisions for the tools used for shape inspection of large diameter heads (see 6.4.4; 6.4.2 of the 2011 edition);

8) ADD the requirement that the shell assembled by thinning the edge of thick plates on one side or both sides shall meet the design strength requirements (see 6.5.3);

9) ADD the requirements for the assembly alignment of composite plate pressure vessels, lined pressure vessels, pressure vessels with cladding layers, as well as the assembly alignment of lining parts in composite plate pressure vessels and lined pressure vessels [see 6.5.5 a)];

10) ADD the requirement for visual inspection during the pressure vessel fabrication process (see 6.8.4).

1) CHANGE the provisions on welding environment (see 7.1.1; 7.1.2 of the 2011 edition);

2) ADD the requirements for welding environment for non-ferrous metal lining parts (see 7.1.1.3);

3) ADD the provisions on welding gas (see 7.1.2.1);

4) CHANGE the provisions on storage and management of welding materials (see 7.1.2.2; 7.1.1 of the 2011 edition);

5) ADD the provisions for temper brittleness assessment of deposited metal of welding materials for Fe-5A and Fe-5C materials (see 7.1.2.3);

6) ADD the provisions and related requirements for high temperature endurance test of weld metal and welded joints for Fe-5C materials (see 7.1.2.4);

7) ADD the provisions for reheat crack sensitivity assessment of deposited metal for submerged arc welding of Fe-5C materials (see 7.1.2.5);

8) ADD the provisions on the applicable scope of flux-cored welding wire (see 7.1.2.6);

9) ADD the provisions on cleaning and protection of weldments (see 7.1.3);

10) ADD the provisions on welding methods used for welded pressure vessels (see 7.2);

11) CHANGE the impact test qualification index in the welding procedure qualification of chromium-nickel austenitic stainless steel pressure vessels, which have a design temperature lower than -100 °C but not lower than - 196 °C [see 7.3.1 c)];

12) ADD the requirements for impact test in the welding procedure qualification of non-alloy steel and low-alloy steel [see 7.3.1 d)];

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13) ADD the provisions for simulating the maximum post-weld heat treatment and the minimum post-weld heat treatment of welding procedure qualification specimens of Fe-5A and Fe-5C materials [see 7.3.1 e)];

14) ADD the provisions for additional high temperature tensile test and temper brittleness assessment test for welding procedure qualification of Fe-5A and Fe-5C materials [see 7.3.1 f)];

15) ADD the provisions for welding procedure qualification when welding material is replaced for the base weld of Fe-3 group materials [see 7.3.1 g)];

16) ADD the provisions for maximum thermal treatment and minimum thermal treatment of welding procedure qualification specimens [see 7.3.1 h)];

17) ADD the provisions for welding preheating and post-heating (see 7.3.2);

18) ADD the requirements for the use and storage of flux-cored welding wire (see 7.3.3.2);

19) ADD the requirements for welding of cladding layer and overlay weld (see 7.3.3.3);

20) ADD the provisions for welding arc initiation and arc scratch grinding (see 7.4.5);

21) CHANGE the requirements on the scope of reheat treatment required after welding repair of pressure vessels (see 7.5.6, 7.5.7; 7.4.3, 7.4.4 of the 2011 edition);

22) ADD the requirements for welding repair when pressure vessels are not reheat treated (see 7.5.8);

23) ADD the requirements for welding inspection and testing (see 7.6).

1) ADD the provisions on heat treatment types (see 8.1.1);

3) CHANGE the qualified indicators and the provisions on recovery heat treatment for cold-formed chromium-nickel austenitic stainless steel heads and expansion joints (see 8.3.1.1, 8.3.1.4, 8.3.1.5; 8.1.1 of the 2011 edition);

4) ADD the provisions on recovery heat treatment for composite plate formed parts (see 8.3.1.8);

5) ADD the provisions on recovery heat treatment methods for formed pressure components (see 8.3.1.9);

6) CHANGE the provisions on determining the thickness of post-weld heat treatment (see 8.4.2, Table 4; 8.2.1, Table 5 of the 2011 edition);

7) ADD the provisions on determining whether post-weld heat treatment is performed on composite plate welded joints (see 8.4.5);

8) ADD the provisions for the maximum temperature drop when adopting the heat treatment process of lowering the insulation temperature and extending the insulation time [see 8.4.7 a)];

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