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**NATIONAL STANDARD OF THE
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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 1: General requirements;
- Part 2: Materials;
- Part 3: Design;
- 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);
- b) CHANGE the scope of application and terminology of the calculation formula for internal pressure cylinders (see 5.3; 3.3 of the 2011 edition);
- c) CHANGE the provisions for the calculation length of external pressure cylinders (see Figure 6-1; Figure 4-1 of the 2011 edition);
- d) CHANGE the external pressure stress coefficient B curve and data table (see Table 6-1, Figure 6-4, Figure 6-6, Figure 6-7; Table 4-1, Figure 4-4, Figure 4-6, Figure 4-7 of the 2011 edition);
- e) ADD the external pressure stress coefficient B curve and data table (see Figure 6-13, Figure 6-14);
- 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);
- i) CHANGE the allowable range of the semi-apex angle of the large-end non-folded

- conical head (see Table 7-4; Table 5-4 of the 2011 edition);
- j) CHANGE the design method of the reinforcement section connecting the internal pressure non-folded conical shell and the cylinder (see 7.6.4; 5.6.4 of the 2011 edition);
 - k) CHANGE the reinforcement design of the connection between the conical shell 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);
 - l) CHANGE the "External pressure calculation block diagram of the connection between the conical shell and the cylinder" (see Figure 7-20; Figure 5-18 of the 2011 edition);
 - m) CHANGE the maximum angle value of the calculation of the non-axisymmetric eccentric conical shell from 30° to 45° (see 7.7.1; 5.7.1 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);
 - p) CHANGE the applicable scope and related definitions of openings and opening reinforcement (see 8.1; 6.1 of the 2011 edition);
 - q) CHANGE the design requirements for multiple openings on the flat cover (see 8.4.3; 6.4.3 of the 2011 edition);
 - r) CHANGE the relevant data in the "Basic sealing width of gasket" table (see Table 9-1; Table 7-1 of the 2011 edition);
 - 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);

- w) CHANGE the minimum limit value of the ratio -- of the nominal thickness of the 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);
- x) CHANGE the content of Table C.7 in C.6.2, changing the original table "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);
- y) DELETE Tables C.8 and C.9 (C.8 and C.9 of the 2011 edition);
- z) CHANGE the formula C.89 [see Formula (C.89); Formula (C.89) 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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