

《固定式压力容器安全技术监察规程》
(TSG R0004-2009)
第 1 号修改单英文翻译
(对 2009 年 9 月第 1 版的修改)

**The First Revision to Supervision Regulations on Safety Technology
for Stationary Pressure Vessels**

TSG R0004-2009

(Revisions to the first edition of September 2009)

1. Revisions to Article 2.1(6) and Article 2.1(7)

2.1(6) When the pressure vessel manufacturer obtains materials not from steel Mill for the pressure vessel, an original material quality certificate provided by the steel Mill or a copy of the material quality certificate with an official inspection stamp of the material supplier and a manager's stamp are required.

2.1(7) The pressure vessel manufacturer is responsible for the authenticity and consistency of the pressure vessel material and its quality certificate.

2. Revisions to Article 2.9.1(3), Article 2.9.1(4), and Article 2.9.1(6)

2.9.1(3) Material quality certificates shall conform to provisions of Article 2.1 of this Regulation.

2.9.1(4) Manufacturers of pressure vessels shall review and verify incoming materials and material quality certificates, and re-examine the chemical composition and mechanical properties of materials to meet the requirements of this Regulation and corresponding material standards prior to using.

2.9.1(6) For low alloy steels with the specified lower limit of tensile strength equal to or greater than 540MPa, and to be used for pressure vessels with the design temperature lower than -40°C, the material manufacturer shall apply for a technical evaluation and assessment and get approval according to Article 1.9 of this Regulation before the material is allowed to be in use.

3. Revisions to Article 2.9.2

2.9.2 Foreign designate steel plate (band) produced by domestic Mills shall conform to the requirements in Article 2.9.1 of this Regulation. Steel plate (band) except for those as mentioned in Article 2.9.1(6) shall apply for a technical evaluation and assessment, which include evaluations to the Mill's related condition, steel plate (band) technical documents for manufacture or trial manufacture (including technical supply conditions).

4. Revisions to Article 2.10.2

2.10.2 For low alloy steels listed in GB150 or JB4732 with the specified lower limit of tensile strength equal to or greater than 540MPa, and to be used for pressure vessels with design temperature lower than -40°C, if the steel Mill does

not have the relevant experience in the steel making or pressure vessel fabrication, the Mill shall carry out systematically experimental research, and then apply for the technical evaluation and assessment and get approval according to Article 1.9 of this Regulation prior to using.

5. Revisions to Article 2.11(2)

2.11(2) For the grade IV forging purchased for the category III pressure vessel, and/or the material used for main pressure components of which the authenticity of material quality certificate is uncertain or the mechanical properties and chemical composition are doubtful, the manufacturer of pressure vessels shall conduct re-examination on the material. The material can only be put into fabrication while it conforms to the provisions of this Regulation and corresponding material standards.

6. Revisions to Article 3.1(3)

3.1(3) The design of pressure vessels shall conform to the essential safety requirements of this Regulation. For pressure vessels designed by international standards or codes outside P.R. China, the designer shall provide documents to AQSIQ to declare the design has satisfied the essential safety requirements specified in this Regulation.

7. Revisions to Article 3.2(1)

3.2(1) A design licensing stamp of special equipment (pressure vessel) shall be sealed on the assembly drawing of the pressure vessel(a copy of stamp is invalid). The design drawings sealed with the invalid design licensing stamp or as-built stamp shall not be used for fabrication.

8. Revisions to Article 3.4.1(1)

3.4.1(1) The design documents of pressure vessels include strength calculation sheets or stress analysis reports, design drawings, manufacturing technical specification, risk assessment report (applicable for category III pressure vessels). When necessary, the installation, operation, and maintenance instructions shall also be included.

9. Revisions to Article 3.18(2)

3.18(2) For pressure vessels incapable but necessary of setting inspection openings, the designer shall provide specific technical measures such as increasing the items or percentage of inspection in manufacture, and shall specify requirements about key inspection items, methods of periodic inspection in service.

10. Revisions to Article 3.22

3.22 For pressure vessel or pressure parts that have particular requirements of corrosion-resistant, for example those in corrosion medium condition with inter-granular corrosion, stress corrosion, pitting corrosion, crevice corrosion, etc, the corresponding testing methods of corrosion resistance and other technical

requirements shall be prescribed on design drawings.

11. Revisions to Article 4.1.4.1(4)

4.1.4.1(4) Pressure vessel design documents provided by the designer

12. Revisions to Article 4.5.3.1(3)

4.5.3.1(3) The welded joints with surface crack shall carry out surface NDT preferentially.

13. Revisions to Article 4.5.3.2.2(4)

4.5.3.2.2(4) Pressure vessels with welded joint efficiency of 1.0 or pressure vessels need but incapable of internal inspection after putting into use.

14. Revisions to Article 4.5.3.2.3(1)

4.5.3.2.3(1) The location of the spot nondestructive examination shall be specified by the manufacturer based on the actual situation, but it shall include the intersecting portions of the Categories A and B welds and the welds to be covered by other components(Note 4-1);

Note 4-1: For glass-lined equipment, the NDT for the assembling welds of the top and bottom connect rings with the jacket, and the NDT for the welds of nozzles with nominal diameter less than 250mm shall be in accordance with the relevant national standards and industrial standards for glass-lined equipment.

15. Add Article 4.5.3.2.4 Surface NDT after Article 4.5.3.2.3

4.5.3.2.4 Welded joints shall perform MT or PT on their surface according to the requirements of drawings for one of the following conditions:

- (1) Welded joints of low alloy steel cryogenic pressure vessel with design temperature lower than -40°C;
- (2) Welded joints of pressure vessels made of low-alloy steel with specified lower limit of tensile strength equal to or greater than 540MPa, ferritic stainless steel and austenitic/ferritic stainless steel;
- (3) Welded joints of austenitic stainless steel pressure vessels with joints' thickness more than 20mm;
- (4) Welded joints(Categories A and B welds are excluded)of Cr-Mo low alloy steel pressure vessel with joints' thickness more than 16mm;
- (5) Surfacing welded joints, welded joints in plate cladding and overlay, dissimilar steel welded joints, and the welded joints with the reheat cracking tendency and the delayed cracking tendency;
- (6) All the spliced joints of convex head(plate-jointed first and then formed) of the pressure vessel that require spot RT or UT;
- (7) When required by design drawings and required by standards referenced in this Regulation.

16. Revisions to Article 4.5.3.4.1(2)

4.5.3.4.1(2) For butt-welded joints requiring spot nondestructive examination, the radiographic test technology level shall not be lower than Class AB, the acceptable quality criterion shall not be lower than Class III.

17. Revisions to the explanation of *P* in Article 4.7.2

P—Design pressure of the pressure vessel or the maximum allowable working pressure specified on the nameplate of the pressure vessel(for the pressure vessel in service, generally taken as the allowable/monitoring operating pressure determined by periodical inspection), MPa;

18. Revisions to the contents of Article 5.2

Prior to the installation, alteration and major repairs of pressure vessels, the company engaged in installation, alteration and repair shall submit a notification in writing to the register authority for pressure vessel service.

19. Article 5.3.3(5) is deleted

20. Add Article 5.3.4 Pressure test for alteration and major repair after Article 5.3.3

Pressure vessels under any one of the following conditions shall perform pressure test for alteration and major repair:

- (1) main pressure components are replaced by welding;
- (2) the repair welding of the main pressure component is more than half of its thickness;
- (3) Operation condition is changed to exceed the original design parameter, and pass the strength verification;
- (4) Replacement of the lining (the pressure test shall be performed before the replacement of the lining).

21. One more sub-article is added to Article 6.11

For the pressure vessels to be reused after out of service for two years, and pressure vessels reinstalled from the company or from other companies, inspection shall be performed prior to use according to the requirements of periodical inspection, and pressure test shall also be carried out.

22. Revisions to Article 6.13(4)

The filling unit or the user must perform hydrostatic test to the pipes or the flexible tubes of filling and discharging every 6 months, and the test pressure shall be 1.5 times of the nominal pressure. The test results shall be recorded and signed by the personnel who perform the test.

23. Revisions to Article 7.4

7.4 The inspection institute shall prepare the inspection plan based on the service situation and possible failure modes of the pressure vessel. Periodic inspection methods mainly include the visual inspection, the thickness measurement and the

surface nondestructive examination. If necessary, RT, UT, hardness test, metallographic examination, material property test, electromagnetic examination, strength verification or strain measure, pressure test, acoustic emission test, leak test etc can also be used.

24. Revisions to Article 7.5

7.5 During the periodical inspection, when the user or inspection institute has doubts on the pressure vessel safety, the pressure test shall be performed.

25. Revisions to Article 8.4.1(3)

8.4.1(3) The maximum scale on the pressure gage shall be 1.5–3.0 times of the working pressure.

26. Revisions to Article 8.5.1(1), Article 8 .5.1(2), and Article 8.5.1(5)

8.5.1(1) The selection of liquid level gages of the pressure vessel is based on the medium contained, the maximum allowable working pressure (or design pressure), and design temperature.

8.5.1(2) Prior to installation and usage, the liquid level gage used for the pressure vessel with the design pressure less than 10MPa shall be tested hydrostatically with a pressure of 1.5 times of the nominal pressure of the liquid level gage. The liquid level gage used for the pressure vessel with the design pressure equal to or greater than 10MPa, the liquid level gauge shall be hydrostatically tested with a pressure of 1.25 times of the nominal pressure of the liquid level gage;

8.5.1(5) For the pressure vessel containing explosive or extremely, highly toxic medium, or liquefied gas, the liquid level gage shall be equipped with the protection device against leakage.

27. Revisions to the beginning of A1.1

A1.1 Mediums of pressure vessels are classified into two groups as following.

28. Revisions to A3(4)

A3(4) Storage vessels (symbol C, for spherical tanks, symbol B): pressure vessels mainly used for storing and containing substance of gases, liquids, or liquefied gases etc, such as various types of storage tanks.

In addition, some wordings are revised.

Supervision Regulations on Safety Technology for Stationary Pressure Vessels are revised according to this Revision Notice and are reprinted.