

TSG

Safety Technology Regulation for Special Equipment

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压力管道安全技术监察规程—工业管道
Pressure Pipe Safety Technology Supervision Regulation for
Industrial Pressure Pipe

Issued on May 08, 2009

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the People's Republic of China**

Foreword

In November 2002, Bureau of Safety Supervision of Special Equipment of the General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ) (hereinafter referred to as "Bureau of Special Equipment") assigned the Sub-Technical Committee for Safety of Pressure Pipes with the National Technical Committee for Standardization of Boiler and Pressure Vessels (hereinafter referred to as "Pipe Subcommittee") to make a draft of this regulation. In December 2002, Pipe Subcommittee organized the relevant experts to establish drafting group and held working conference in Shanghai, and then formed preparation outlines and basic contents of "Pressure Pipe Safety Technology Supervision Regulation for Industrial Pressure Pipe". In August 2003, the second plenary meeting was held in Shanghai, in which the major issues in terms of the drafting work were discussed. In June 2004, the third plenary meeting was held in Shanghai, in which the draft of "Pressure Pipe Safety Technology Supervision Regulation for Industrial Pressure Pipe" was formed through discussion and modification. At the same time, the relevant experts were invited to discuss on the draft, which was modified referring to the experts' suggestions. In November 2007, the drafting group held working conference in Beijing. In comparison with the being-modified standard and giving consideration to the current management style of the national industrial pressure pipes, this draft was further modified and draft standard for comment was formed. In January 2008, according to the requirements of Document Zhi Jian Te Han [2008] No.4, the Bureau of Special Equipment sought opinions from the grassroots department, the departments concerned and experts and citizens, then the drafting group made some modification and formed draft standard for examination according to the solicited opinions. In April 2008, the Bureau of Special Equipment submitted the draft standard for examination to special equipment safety technology committee of GAQSIQ for consideration and the drafting group, in light of the deliberation opinions, made some modifications and formed the draft standard for approval, which was approved and issued by GAQSIQ on May 8, 2009.

Giving consideration to the actual state of the safety technology for pressure pipes and those requirements in the relevant national administrative licensing, this regulation specifies the basic requirements for safety performance of pressure pipes in the aspects of materials, design, manufacture, installation, application, maintenance, reconstruction, periodic inspection and safety protection devices in order to achieve the goal of regulating the supervision and control of pressure pipes.

Participating organizations and staffs of this regulation are:

Bureau of Safety Supervision of Special Equipment of GAQSIQ: Xiu Changzheng, Du Shunxue
Sub-Technical Committee of Pressure Pipe with the National Technical Committee for Standardization of Boiler and Pressure Vessels: Huang Zhenglin, Ying Daoyan
National Technology Center of Process Equipment: Xia Dikai, Cai Nuanshu
China Special Equipment Inspection and Research Institute Qi Yuedi
China National Chemical Engineering Third Construction Co., Ltd.: Xia Jiewen
Liaoning Institute of Safety Science: Liu Jinshan
Shanghai Runyang Chemical Technology Consulting Co., Ltd.: Yu Qingsheng
Zhejiang Bureau of Quality and Technical Supervision: Gu Shanle

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Pressure Pipe Safety Technology Supervision Regulation for Industrial Pressure Pipe

1 General Provisions

Article 1 This regulation was formulated in line with the "Regulations on Safety Supervision for Special Equipment", with a view to ensuring the safety operation of industrial pressure pipe, ensuring the personal and property safety of the people and promoting the economic development.

Article 2 This regulation is applicable to process plants, auxiliary equipments and industrial pressure pipes (hereinafter referred to as "pipes") affiliated to the public works within the battery limit. All the process plants, auxiliary equipments and pipes shall meet all of the following requirements:

- (1) Maximum operating pressure is larger than or equal to 0.1MPa (gauge pressure, similarly hereinafter);
- (2) Nominal diameter (NOTE 1) is larger than 25mm;
- (3) Conveyance medium is gas, steam, liquefied gas, liquid whose maximum operating temperature is higher than or equal to its normal boiling point or combustible, flammable, noxious and corrosive liquid.

Article 3 This regulation is applicable to the following pipe scope:

- (1) Pipe elements, including pipe components (NOTE 2) and pipe support parts (NOTE 3);
- (2) Joints between pipe elements, the first joint (weld, flange, sealing member and fastener, etc.) connecting the pipe and equipment or device, and joints between the pipes and non-pressure parts;
- (3) Safety valves, bursting disc devices, flame arresters, emergency shutoff devices and other safety protection systems used for the pipes.

NOTE 1: The nominal diameter is the inside nominal diameter and nominal dimension, the code is usually indicated in DN.

NOTE 2: Pipe components are used to connect or assemble the pressure-bearing and enclosed pipe systems, including pipes, pipe fittings, flanges, sealing members, fasteners, valves, safety protection systems, compensators, flexible joints, pressure hoses, filters (such as Y-shape and T-shape), throttling devices (such as orifice plates) in the pipes and segregators.

NOTE 3: Pipe supporting elements, including steeves, spring supporters and hangers, diagonal bars, balance weights, elastic bolts, support bars, chains, guideways, cradles, bases, rollers, brackets, sliding supports, lifting eyes, hangers, clasps, pipe clips, U-clamps and plywoods.

Article 4 The following pipes shall comply with provisions specified in other relevant safety technology regulations:

- (1) Pipes whose nominal pressure is above 42MPa;
- (2) Non-metallic pipes.

Article 5 This regulation is not applicable to the following pipes:

- (1) Pipes special for the electrical equipments and telecommunication;
- (2) Power pipes;
- (3) Pipes for military equipments and nuclear facilities;
- (4) Pipes for offshore installations and pipes down the mine;
- (5) Pipes special for mobile equipments like railway locomotives, automotives, ships and aerospace crafts;
- (6) Pipes for petroleum, natural gas and terrestrial heat exploration and excavation devices;
- (7) Long-distance (oil-gas) pipes and oil/gas field gathering pipes;
- (8) Pipes for town and municipal utilities;
- (9) Pipes belonged to the body of refrigeration and air conditioning equipments as well as pipes special for heating and ventilation;
- (10) Other pipes within the scope specified in "Regulations on Safety Technology for Special Equipment".

Article 6 Manufacturing of the pipe elements and the design, installation (including the field fabrication, the same below), reconstruction, maintenance, application and inspection/testing shall be in accordance with this regulation.

Quality and technical supervision departments (hereinafter referred to as "quality inspection departments") at all levels are responsible for the safety supervision of pipes and for the supervision of the implementation of this regulation.

Article 7 This regulation specifies basic safety requirements for the pipes, other provisions (such as technical standards and internal enterprise provisions) shall not be lower than the requirements of this regulation.

Article 8 Pipes within the application scope of this regulation are divided into GC1, GC2 and GC3, three grades according to the design pressure, design temperature, media toxicity degree, corrosivity and fire risk.

The classification of pipe grades, media toxicity degree, corrosivity and fire risk are described in Annex A.

Article 9 When the manufacturing of pipe elements and the design, installation technical requirements of pipes are not in line with this regulation, type test or technical appraisalment shall be carried out on the basis of reference and experimental study. The basis, conditions and results of the test as well as the inspection report of third party and other related technical data shall be submitted to GAQSIA, which will entrust the relevant technical organizations or technical institutions to conduct technical evaluation. Until the results of technical evaluation are authorized by GAQSIQ, those pipe elements or pipes may be tried.

Article 10 The design, installation and inspection of pipes shall be in accordance with those specified in GB/T 20801-2006 "Pressure Piping Code - Industrial Piping" and other relevant national standards. When international standards or foreign standards are adopted, they shall be first transformed into enterprise standards or engineering specifications. The design, installation and inspection of class GC1 pipe shall still be submitted to GAQSIQ for the record. GAQSIQ, when necessary, may entrust the relevant technical organizations or technical institutions to make evaluation. If no corresponding standard is provided, the pipe design, installation and inspection shall not be carried out.

Article 11 As for the imported pipe elements and their materials and safety protection devices as well as pipes which are manufactured, fabricated and used domestically by the

domestic manufacturing organization (including the foreign-invested enterprises) introducing foreign technologies and standards, if their technical requirements and working conditions are out of line with the provisions in this regulation, then it shall be handled referring to those specified in Article 9 and Article 10.

Article 12 Non-destructive testing personnel who are committed to the manufacturing of pipe elements and installation, reconstruction, maintenance and periodic inspection of pipes shall obtain non-destructive testing personnel qualification certificate for special equipment and shall be occupied in non-destructive testing work within the permitted scope.

Non-destructive testing institutions which are engaged in the manufacturing of pipe elements and pipe installation, reconstruction, maintenance and periodic inspection shall obtain "Inspection and Testing Institution Approval Certificate of Special Equipment" issued by GAQSIQ.

Article 13 Welding personnel (hereinafter referred to as "welders") engaged in the pipe element manufacturing and pipe installation, reconstruction, maintenance welding must obtain corresponding "Special Equipment Operator Certificate", and then could they undertake welding work within the qualified scope until the due date.

Safety management personnel and operators of pipes shall obtain corresponding "Special Equipment Operator Certificate".

2 Pipe Elements

2.1 Basic Requirements

Article 14 The design pressure of standard parts of the pipe elements shall be in accordance with the requirements specified in the relevant safety technology regulations and their corresponding standards. Non-standard pipe elements shall still be provided with design calculations and drawings.

Article 15 Manufacturing organizations of pipe elements shall obtain "Manufacture License for Special Equipment" and shall accept the supervision and inspection for their product manufacturing process by the special equipment inspection and testing institutions in light of the relevant safety technology regulations.

Article 16 Manufacturing of the pipe elements shall be provided with design (technical) documents and manufacturing process documents and also shall meet the requirements in the relevant safety technology regulations and their corresponding standards.

Article 17 Manufacturing of the pipe components shall be in accordance with provisions specified in the relevant safety technology regulations and their corresponding standards. As for the welding (including the repair welding) in the manufacturing process, welding procedure qualified through assessment shall be adopted and welders with qualification certificate shall be responsible for the welding. Welding procedure qualification and welder trade tests shall be in accordance with the requirements specified in the relevant safety technology regulations and their corresponding standards.

Article 18 Manufacturing organizations of pipe elements shall provide product quality certificate documents stamped with their quality inspection seals according to the supply batches of the pipe elements. As for those pipe elements supervised and inspected, they still shall be

provided with supervision and testing certificate issued by the special equipment inspection and testing institutions.

Quality certificate documents of the pipe components include product qualification certificate and quality certificate. Product qualification certificate usually covers the product name, serial number, specification type and voluntary standards, etc. (for specific format, see Annex B). And the quality certificate usually includes the following contents except for those contents included in the product qualification certificate:

- (1) Chemical compositions of the materials;
- (2) Mechanical properties of the materials and welding joints;
- (3) Heat treatment state;
- (4) Results of non-destructive testing;
- (5) Pressure test results (applicable to the relevant safety technology regulations and their corresponding standards or those specified in the contract);
- (6) Type test results (applicable to those requiring type test);
- (7) Other inspection items specified in the product standards or contract;
- (8) Quality certificates of outsourced semi-finished products or finished products.

Pipe supporting elements shall be provided with product quality certificate documents according to the provisions stipulated in the relevant safety technology regulations and their corresponding standards.

Product qualification certificates and quality certificates shall be stamped by quality inspection personnel and quality assurance engineer of the manufacturing organization.

Article 19 Pipe components shall be signed and marked piece by piece. The marking contents generally include code or brand of the manufacturing organization, license sign, material (grade, specification and furnace batch number), and product code. In addition, they also shall be in accordance with the requirements specified in the relevant safety technology regulations and their corresponding standards. If the product specification is too small and can not be marked with all the contents, then labels may be adopted or partial contents may be omitted in terms of corresponding requirements. It shall be able to trace back to the product quality certificate document from the product markings.

Article 20 As for valves for the pipes, not only the requirements stipulated in this regulation, but those in other safety technology regulations also shall be complied with.

2.2 Materials

Article 21 Selection of materials for pipe components shall meet the following basic requirements and in the design, appropriate materials shall be selected according to specific working conditions and media:

- (1) Be in line with the provisions stated in the corresponding material standards; in the application aspect, it shall be in line with the provisions in the relevant pipe safety technology regulations;
- (2) Elongation of metal materials shall not be lower than 14% and materials shall be provided with sufficient anti-brittle failure capability at the minimum service temperature. When metal materials whose elongation is lower than 14% must be applied on grounds of specific causes, necessary protective measures must be able to be taken;

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