



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

GB/T 20801.2-2020

Pressure piping code - Industrial piping - Part 2: Materials

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1 Scope

This Part of GB/T 20801 specifies the basic requirements for materials for pressure piping components, including the selection of materials, restrictions on use based on material properties, marking and quality certification.

This Part applies to the selection and use of materials, for pressure piping components, which are defined in the scope of GB/T 20801.1.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 229 Metallic materials - Charpy pendulum impact test method

GB/T 1220 Stainless steel bars

GB/T 1348 Spheroidal graphite iron castings

GB/T 2882 Nickel and nickel alloys tube

GB/T 3077 Alloy structure steels

GB/T 3087 Seamless steel tubes for low and medium pressure boiler

GB/T 3091 Welded steel pipes for low pressure liquid delivery

GB/T 3098.1 Mechanical properties of fasteners - Bolts, screws and studs

GB/T 3098.6 Mechanical properties of fasteners - Stainless steel bolts, screws and studs

GB/T 3624 Titanium and titanium alloy seamless tubes

GB/T 4334 Corrosion of metals and alloys - Test methods for intergranular corrosion of stainless steels

GB/T 4437.1 Aluminium and aluminium alloy extruded tubes - Part 1.

Seamless tubes

GB/T 5310 Seamless steel tubes and pipes for high pressure boiler

GB/T 6479 Seamless steel pipes for high-pressure fertilizer equipment

GB/T 6614 Titanium and titanium alloy castings

3 Terms and definitions

The terms and definitions, as defined in GB/T 20801.1-2020, GB/T 20801.3-2020, GB/T 20801.4-2020, GB/T 20801.5-2020, GB/T 20801.6-2020, as well as the following terms and definitions, apply to this document.

3.1 Low temperature and low stress service

The working conditions, that need to meet the following conditions, at the same time.

3.2 Low temperature and lower stress service

The working conditions that need to meet the following conditions, at the same time.

3.3 Electric-resistance welded pipe; ERW

The pipe, which is continuously butt-welded, under the action of pressure, by the use of the pipe (coil) itself as the current loop, through electric resistance heating.

3.4 Electric-fusion welded pipe; EFW

The pipe, which is longitudinally butt-welded on the preformed blank, by the use of

automatic arc welding or manual arc welding.

3.5 Plate welded pipe

An electrofusion welded pipe, is preformed from a flat plate into a tubular shape AND has one or two longitudinal straight welds.

3.6 Inspection certificate

A form of material quality certification (inspection document). It is an inspection document, which is indicated of the results, by the independently authorized departments or personnel outside the production department of the manufacturer, after inspection and test on the delivered products (or sampling), according to the provisions of the standard and contract.

4.1 Material selection

The owner or designer shall select appropriate materials for piping components, according to the specific use conditions (including manufacturing, fabrication and installation, media, operating conditions, working environment, testing, etc.)

AND the material use requirements and restrictions specified in this Part, considering the risk of material damage.

4.2.1 Table A.1 and Table A.2 of Appendix A specify the designations, allowable

stress and application range of the piping component materials. The materials, which are used for the piping components, shall comply with the requirements of the material standards, as listed in Table A.1 and Table A.2.

4.2.2 In addition to the materials listed in Table A.1 and Table A.2, the following

materials can be used for piping components; however, they shall meet the requirements and use restrictions for corresponding materials in this Part.

4.2.3 Materials with unknown designations shall not be used for piping

components.

4.2.5 The selection of other materials shall be subject to technical appraisal and

review & approval, by institutions with corresponding qualifications.

5.1 The materials, which are used for pressure components (except bolts), shall

have sufficient strength, plasticity, toughness. They shall have sufficient resistance to brittle fracture, at the lowest use temperature. When brittle materials, which have an elongation

rate of less than 14%, are used, it shall take necessary safety protection measures.

5.2 The selected materials shall have sufficient stability, including chemical

properties, physical properties, corrosion and wear resistance, fatigue resistance, organizational stability.

5.3 When selecting materials, it shall consider the applicability of the materials

under possible open flames, fires and extinguishing conditions, as well as changes in material properties and secondary hazards, which are brought about by this.

5.4 The selected materials shall be suitable for the corresponding

manufacturing, production, installation, including welding, cold and hot processing, heat treatment requirements.

5.5 When several different materials are used in combination, it shall consider

the possible adverse effects.

6.1.1.1 When nodular cast iron is used for piping components, its elongation

shall not be less than 15%; the use temperature shall not be higher than 350 °C, but it shall be higher than -20 °C. The use restrictions of nodular cast iron piping components, which are listed in Table 13 of GB/T 20801.3-2020, shall comply with the corresponding requirements of GB/T 13295.

6.1.1.2 Except for GC3 grade pipes, nodular cast iron shall meet the impact

performance requirements of GB/T 1348; the pressure rating shall not exceed 5.0 MPa.

6.1.2.1 When the gray cast iron and malleable cast iron, which are listed in

Table A.1, are used for piping components, they shall meet the following requirements.

6.1.2.2 In addition to meeting the requirements of 6.1.2.1, the applicable

pressure-temperature ratings of gray cast iron and malleable cast iron pipes, fittings, pipe flanges, valves shall also meet the requirements of the corresponding standards, in Table 13 of GB/T 20801.3-2020.