

HG

CHEMICAL INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HG/T 20581-2011

Replacing HG 20581-1998

Specification for materials selection of steel chemical vessels

钢制化工容器材料选用规定

(English Translation)

Issued on: May 18, 2011

Implemented on: June 1, 2011

Issued by: Ministry of Industry and Information Technology of the
People's Republic of China

Table of Contents

1	Scope
2	Normative References
3	Terms and Definitions
4	General
5	Principles for Selection of Steels
6	Specifications of Steels
7	Applicable Limit and Scope of Steels
8	Welding Consumables
9	Appraisal and Application of New Materials
10	Application of Steels with Foreign Specification Number
11	Substitution of Steels
	Annex A (Informative Annex) Mechanical Properties of Commodity Grade Bolts
	Annex B (Informative Annex) Composition and Properties of Some Special Welding Consumables
	Annex C (Informative Annex) Nickel and Nickel Alloy Welding Consumables

1.0.1

This standard specifies the selection, specifications, applicable limit and scope, as well as the application and substitution requirements of new materials and steels produced according to foreign standards.

1.0.2

This standard is applicable to the welding consumables selection for carbon steel, high strength low alloy steel, pearlite heat resistant steel, stainless steel and stainless clad steel plate chemical vessels whose design pressure is not greater than 35.0MPa and design temperature greater than -20 °C. The materials include rolled metal, forgings, castings and welding consumables.

1.0.3

The selection, specifications and application scope of welding consumables for vessels pressure parts and their accessories shall meet the requirements of this standard. The higher or special requirements for the materials in the design, if any, shall be indicated in the drawings or corresponding documents.

2 Normative References

The following documents are indispensable for the application of this standard. For dated references, only the dated edition is applicable to this document. For undated references, the latest editions of the normative documents (including all the amendments) are applicable to this document.

Hexagon Nuts-Product Grade C GB/T 41

Steel Pressure Vessels GB 150

Quality Carbon Structural Steels GB/T 699

Carbon Structural Steels GB/T 700

Steel Plates for Boiler and Pressure Vessels GB 713

Stainless Steel Covered Electrodes GB/T 983

Stainless Steel Bars GB/T 1220

Heat-Resistant Steel Bars GB/T 1221

Stainless Acid-Resistant Steel Castings-Specifications GB/T 2100

Test method for acid resistance of vitrified clay pipe GB 2835

Alloy Structure Steels GB 3077

Seamless Steel Tubes for Low and Medium Pressure GB 3087

Welded Steel Pipes for Low Pressure Liquid Delivery GB 3092

Mechanical Properties of Fasteners GB/T 3098

Wire Rod for Electrode GB/T 3429

Stainless Steel Rods and Wires for Inert-Gas Shield Welding GB 4233

Stainless Steel Wires for Welding GB 4242

Method of 10 Percent Oxalic Acid Etch Test for Stainless Steels GB/T 4334.1

Method of Ferric Sulfate-Sulfuric Acid Test for Stainless Steels GB/T 4334.2

Method of 65 Percent Nitric Acid Test for Stainless Steels GB/T 4334.3

Method of Nitric-Hydrofluoric Acid Test for Stainless Steels GB/T 4334.4

Method of Copper Sulfate-Sulfuric Acid Test for Stainless Steels GB/T 4334.5

Carbon Steel Covered Electrodes GB/T 5117

Low Alloy Steel Covered Electrodes GB/T 5118

Carbon Steel Electrodes and Fluxes for Submerged Arc Welding GB/T 5293

Seamless Steel Tubes and Pipes for High Pressure Boiler GB 5310

Radiographic Testing For Steel Castings GB/T 5677

Seamless Steel Pipe and Tubing Methods for Ultrasonic Testing GB/T 5777

Hexagon Head Bolts-Product Grade C GB/T 5780

Hexagon Head Bolts-Full Thread-Product Grade C GB/T 5781

Hexagon Head Bolts GB/T 5782

Hexagon Head Bolts-Full Thread GB/T 5783

Hexagon Head Bolts; Reduced Shank; Product Grades B GB/T 5784

Hexagon Nuts, Style 1 GB/T 6170

Hexagon Nuts, Style 2 GB/T 6175

Seamless Steel Tubes for High-Pressure for Chemical Fertilizer Equipments GB 6479

Carbon Steel Castings Suitable for Welded Structure GB/T 7659

Steel Tubes-The Inspection Method on Eddy Current Test GB/T 7735

Welding Electrodes and Rods for Gas Shielding Arc Welding of Carbon and Low Alloy Steel GB/T 8110

Seamless Steel Tubes for Liquid Service GB/T 8163

Heat Resistant Steel Castings GB/T 8492

Penetrant Testing for Steel Castings GB/T 9443

Magnetic Particle Testing for Steel Castings GB/T 9444

Seamless Steel Tubes for Petroleum Cracking GB 9948

Carbon Steel Castings for General Engineering Purpose GB/T 11352

Welded Stainless Steel Pipes for Liquid Delivery GB/T 12771

Low Alloy Steel Electrodes and Fluxes for Submerged Arc Welding GB/T 12470

Steel Wires for Melt Welding GB/T 14957

Stainless Steel Seamless Tubes for Fluid Transport GB/T 14976

Nickel and Nickel Alloy Wires and Rods GB/T 15620

Stainless Steel Electrodes and Fluxes for Submerged Arc Welding GB/T 17854

Stainless and Heat-resisting Steels-Designation and Chemical Composition GB/T 20878

Detecting Susceptibility to Intergranular Corrosion in Stainless Steel Pressure Vessels GB/T 21433

Stainless Steel Plate, Sheet and Strip for Pressure Equipments GB 24511

Specification for Carbon Steel Castings for Pressure Vessels HG/T 2741

Welded Austenitic Stainless Steel Tubes HG 20537

Specification of Design Base for Steel Chemical Vessels HG/T 20580

Copper and Copper Alloy Wires and Rods JB 2736-1980

General Specifications for Open Die Forgings on Hammer JB/T 4385.1

Carbon and Low - Alloy Steel Forgings for Pressure Vessels JB 4726

Stainless Steel Forgings for Pressure Vessels JB 4728

Nondestructive Testing of Pressure Equipments JB/T 4730

Technical Permission of Steel Welding Rod Purchasing for Pressure Vessels JB/T 4747

Welding Procedure Qualification for Steel Pressure Vessels JB 4708

Material Selection Guideline for Design of Major Equipment in Key Units Processing Sour Crude Oil SH/T 3096

Stainless Steel Rods and Wires for Inert-Gas Shield Welding YB/T 5091

Stainless Steel Wires for Welding YB/T 5092

Supervision Regulation on Safety Technology for Stationary Pressure Vessel TSG R0004-2009

3 Terms and Definitions

For the purposes of this standard, the terms and definitions established in "Steel Pressure Vessels" GB 150 and "Specification of Design Base for Steel Chemical Vessels" HG/T 20580 and the following ones apply.

3.0.1 Carbon steel

It refers to the iron carbon alloy, without other intentionally-added alloy elements (elements such as Si and Al may be added for the purpose of deoxygenation), whose manganese content is less than or equal to 1.20 % and carbon content is less than or equal to 2.0 % . Low carbon steel generally refers to the carbon steel whose carbon content is less than or equal to 0.25 %.