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

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Replacing GB/T 20878-2007

Stainless steels - Designation and chemical composition

不锈钢 牌号及化学成分

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part

1. Rules for the structure and drafting of standardizing documents". This document replaces GB/T 20878-2007 "Stainless and heat-resisting steels -- Designation and chemical composition". Compared with GB/T 20878-2007, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) In the Scope chapter, "heat-resistant steel" was deleted (see Chapter 1 of this Edition; Chapter 1 of Edition 2007);

b) The term and definition of "heat-resistant steel" was deleted (see Chapter 2 of Edition 2007);

c) The definition of "austenitic-ferritic (duplex) stainless steel" has been changed (see Chapter 3 of this Edition; Chapter 2 of Edition 2007);

d) The criteria for determining the limit values of manganese, phosphorus, nitrogen and copper content have been changed (see

4.3 of this Edition;

3.3 of Edition 2007);

e) The provisions on the representation method of stainless steel designations and unified digital codes have been added (see Chapter 5 and Annex A of this Edition);

f) Some unified digital code representation methods have been modified (see Table 1~Table 5, Table B.1, Table C.1 of this Edition; Table 1~Table 5, Table A.1, Table B.1, Table C.1 of Edition 2007);

g) The chemical compositions of 8 designations have been changed (see Table 1, Table 2, Table 3 and Table 5 of this Edition; Table 1, Table 2, Table 3 and Table 5 of Edition 2007);

h) 97 designations and chemical compositions were added, including 51 for austenitic stainless steel, 14 for austenitic-ferritic (duplex) stainless steel, 23 for ferritic stainless steel, 8 for martensitic stainless steel, and 1 for precipitation hardening stainless steel (see Table 1~ Table 5 of this Edition; Table 1~ Table 5 of Edition 2007);

i) 23 designations and their chemical compositions have been deleted (see Table 1~ Table 5 of this Edition; Table 1~ Table 5 of Edition 2007). Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights. This document was proposed by China Iron and Steel Association. This document shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/TC 183). The drafting organizations of this document. Metallurgical Industry Information Standards Research Institute, Shanxi TISCO Stainless Steel Co., Ltd., Fujian Qingtuo Special Steel Technology Research Co., Ltd., China Iron and Steel Research Institute Co., Ltd., Huzhou Yongxing Special Stainless Steel Co., Ltd., Fushun Special Steel Co., Ltd., Jiangsu Yinhuan Precision Steel Pipe Co., Ltd., Gansu Jiugang Group Hongxing Steel Co., Ltd., Jiangsu Wujin Stainless Steel Co., Ltd., National Carbon Structural Steel Product Quality Inspection and Testing Center (Shandong), Sinopec Engineering Construction Co., Ltd., Shandong Special Equipment Inspection and Research Institute Group Co., Ltd., Shandong Taishan Iron and Steel Group Co., Ltd., Zhejiang Jiuli Special Materials Technology Co., Ltd., Xinghua Juxin Stainless Steel Co., Ltd., Taizhou Tiansheng Stainless Steel Products Co., Ltd., Taizhou Jiqiang Stainless Steel Products Co., Ltd., Zhejiang Zhengtong Pipe Industry Co., Ltd., Zhejiang Compass Fluid Technology Co., Ltd. Main drafters of this document. Luan Yan, Wu Qiang, Jiang Laizhu, Song Zhigang, Chen Genbao, Gu Qiang, Liu Yu, Pan Jixiang, Hou Xiaolong, Hua Yangkang, Wang Jinguang, Shao Yu, Wang Zhiyu, Shi Xianyun, Feng Han, Zhang Yong, Zhao Kun, He Xikou, Liu Ming, Liu Zhenbao, Li Yufeng, Chen Liang, Fei Ting, Wang Chunmao, Wu Yuhong, Liu Yonghua, Gu Fengquan, Ji Youlu, Ding Binhua, Zhang Jingjing, Chen Qingxin, Li Zhaoguo, Yang Xin, Gong Yueqiang. Versions of standard substituted by this document are. - It was first published in 1984 as GB/T 4229-1984; - It was first revised in 2007 as GB/T 20878-2007; - This is the second revision. Stainless steels - Designation and chemical composition

1 Scope

China's master list of stainless steels - the document that says which stainless grades exist in the national system, what each is called, what its unified numerical code is and what it is made of. It specifies the designations and unified digital codes of stainless steels and their chemical composition, gives the physical properties of some grades, and provides a

comparison table between the Chinese designations and codes and those of foreign standards or their nearest equivalents. Stainless steel is not one material but several hundred, and they are not interchangeable in any respect that matters. The austenitic grades are tough, formable, non-magnetic and not hardenable by heat treatment; the ferritic grades are magnetic, cheaper because they carry little or no nickel, and limited in toughness; the martensitic grades harden and are used for cutting and wear; the duplex grades combine the two phases to get strength and chloride resistance together; and the precipitation hardening grades reach high strength after a low-temperature ageing treatment. Within each family, small differences in molybdenum, nitrogen, carbon or stabilising elements decide whether a grade survives a particular chloride concentration, a particular temperature or a particular welding procedure. A product standard for stainless plate, tube, bar or wire cannot restate all of that, so it refers to this document, which is why this is one of the most frequently cited standards in the Chinese steel system. The comparison table with foreign designations is the other reason it is bought: almost every specification that crosses a border needs it. Issued on 24 July 2024 and in force since 1 February 2025, it replaces GB/T 20878-2007.

This document specifies the designations and unified digital codes of stainless steel and their chemical composition. It also provides the physical properties of some designations, and a comparison table of designations and unified digital codes with foreign standard designations (or similar designations). The stainless steel designations, unified numerical codes and chemical compositions specified in this document are applicable to guiding the formulation and revision of stainless steel (including ingots and semi-finished products) product standards. NOTE. In this document, the content of each element representing the chemical composition of stainless steel is expressed in mass fraction.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 8170, Rules of rounding off for numerical values & expression and judgement of limiting values

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 stainless steel Steel containing at least 10.5% chromium (mass fraction) and not more than 1.2% carbon (mass fraction). NOTE. Stainless steel is divided into corrosion-resistant steel, heat-resistant steel and creep-resistant steel according to its main characteristics.

3.2 austenitic stainless steel Stainless steel that the matrix is mainly composed of austenite

with a face-centered cubic crystal structure, which is mainly strengthened by cold working or nitrogen alloying.

3.3 austenitic-ferritic (duplex) stainless steel Stainless steel with a matrix consisting of both austenite and ferrite phases (the content of the lesser phase is at least 25%) that can be strengthened by cold working.

4 General guidelines for determining chemical composition limits

4.1 Carbon When the carbon content is greater than or equal to 0.04%, it is recommended to take two decimal places. When the carbon content is equal to or less than 0.030%, it is recommended to take three decimal places.

4.2 Silicon Unless used as an alloying element, the silicon content of pipes and related products shall not exceed 0.75%, and the silicon content of long strips and forgings shall not exceed 1.00%. For designations that produce both long strips and flat products, the silicon content shall not exceed 1.00%. The choice of the lower or higher limit value is determined by the specific product technical requirements.

4.3 Manganese The manganese content of austenitic stainless steel (except Cr-Mn-Ni or Cr-Mn-Ni-N steel) shall not exceed 2.00%. The manganese content of other types of stainless steel shall not exceed 1.00%. But it does not include free-cutting steel containing high sulfur or selenium or steel that needs to increase nitrogen solid solubility.

4.4 Phosphorus Unless there are special technical requirements that specify a lower limit value, the phosphorus content of austenitic stainless steel shall not exceed 0.045%. The phosphorus content of other types of stainless steel shall not exceed 0.040%. However, free-cutting steel is not included. NOTE. The phosphorus content of some Cr-Mn-Ni or Cr-Mn-Ni-N stainless steels may not exceed 0.060%.

4.5 Sulfur Unless there are special technical requirements specifying a lower limit value, the sulfur content of all types of stainless steel shall not exceed 0.030%. But it does not include free-cutting steel.

4.6 Nickel Unless special technical requirements require a wider composition range (generally higher content), the upper and lower limits of nickel content shall not exceed 3%.

4.7 Chromium The upper and lower limits of chromium content shall be 2%, but the maximum shall not exceed 3%.

4.8 Molybdenum Unless special technical requirements require a wider composition range, the upper and lower limits of molybdenum content in all types of molybdenum-containing stainless steels shall not exceed 1%.

5 Methods for indicating designations and unified digital codes