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Replacing GB/T 3280-2007

Cold rolled stainless steel plate, sheet and strip

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Foreword

This Standard was drafted according to the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 3280-2007 “Cold rolled stainless steel plate, sheet and strip”. Compared with GB/T 3280-2007, the main technical changes are as follows:

- ADD “3/4 cold hardened state” in the classification;
- ADD “edge state” in the order contents;
- ADJUST the dimensional accuracy of steel plates, sheets and strips;
- MODIFY the unevenness of roll-cut steel strips II;
- ADD 23 steel designations and related technical requirements;
- ADJUST the chemical composition of 5 steel designations;
- ADJUST the mechanical properties of 13 steel designations, and SUPPLEMENT some HV hardness;
- MODIFY the original steel designation 022Cr18NbTi to 022Cr18Nb;
- MODIFY the specimens for elongation at break of steel plates, sheets and strips with a thickness of not more than 3 mm to $A_{50\ mm}$;
- ADD 2E surface processing type;
- MODIFY reinspection and determination rules;
- ADD specifications for rounding off of the test results of mechanical properties and chemical composition;
- ADD Annex A “Comparison table of stainless steel designations of various countries” (informative).

This Standard was proposed by China Iron and Steel Industry Association.

This Standard is under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/C 183).

Main drafting organizations of this Standard: Shanxi Taigang Stainless Steel Co., Ltd., Baosteel Stainless Steel Co., Ltd., China Metallurgical Information and Standardization Institute, Sichuan Southwest Stainless Steel Co., Ltd., Ningbo Baoxin Stainless Steel Co., Ltd., Shandong Taishan Steel Group Co.,

Cold rolled stainless steel plate, sheet and strip

1 Scope

This Standard specifies the classification, code, order contents, dimension, shape, weight and allowable deviation, technical requirements, test methods, inspection rules, packaging, marking and quality certificate of cold rolled stainless steel plates, sheets and strips.

This Standard applies to corrosion-resistant cold rolled stainless steel wide steel strip (hereinafter referred to as wide steel strip) and its roll-cut cut-to-size steel plate/sheet (hereinafter referred to as roll-cut steel plate/sheet), slitting cold rolled wide steel strip (hereinafter referred to as slitting wide steel strip) and its roll-cut cut-to-size steel strip (hereinafter referred to as roll-cut steel strip I), cold rolled narrow steel strip (hereinafter referred to as narrow steel strip) and its roll-cut cut-to-size steel strip (hereinafter referred to as roll-cut steel strip II), as well as single-sheet steel plate/sheet.

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 222 Permissible tolerances for chemical composition of steel products

GB/T 223.3 Methods for chemical analysis of iron, steel and alloy - The diantipyryl methane phosphomolybdate gravimetric method for the determination of phosphorus content

GB/T 223.4 Alloyed steel - Determination of manganese content - Potentiometric or visual titration method

GB/T 223.5 Steel and iron - Determination of acid-soluble silicon and total silicon content - Reduced molybdosilicate spectrophotometric method

GB/T 223.8 Methods for chemical analysis of iron, steel and alloy - The sodium fluoride separation - EDTA titration method for the determination of aluminium content

GB/T 223.9 Iron, steel and alloy - Determination of aluminium content -

Chrom azurol S photometric method

GB/T 223.11 Iron, steel and alloy - Determination of chromium content - Visual titration or potentiometric titration method

GB/T 223.16 Methods for chemical analysis of iron, steel and alloy - The chromotropic acid photometric method for the determination of titanium content

GB/T 223.18 Methods for chemical analysis of iron, steel and alloy - The sodium thiosulfate separation iodimetric method for the determination of copper content

GB/T 223.19 Methods for chemical analysis of iron, steel and alloy - The neocuproine-chloroform extraction photometric method for the determination of copper content

GB/T 223.23 Iron, steel and alloy - Determination of nickel content - The dimethylglyoxime spectrophotometric method

GB/T 223.25 Methods for chemical analysis of iron, steel and alloy - The dimethylglyoxime gravimetric method for the determination of nickel content

GB/T 223.26 Iron, steel and alloy - Determination of molybdenum content - The thiocyanate spectrophotometric method

GB/T 223.28 Methods for chemical analysis of iron, steel and alloy - The α-benzoinoxime gravimetric method for the determination of molybdenum content

GB/T 223.33 Methods for chemical analysis of iron, steel and alloy - The chlorophosphonago mA photometric method for the determination of cerium content after extraction separation

GB/T 223.36 Methods for chemical analysis of iron, steel and alloy - The neutral titration method for the determination of nitrogen content after distillation separation

GB/T 223.40 Iron, steel and alloy - Determination of niobium content - The sulphochlorophenol S spectrophotometric method

GB/T 223.53 Iron, steel and alloy - The flame atomic absorption spectrophotometric method for the determination of copper content

GB/T 223.58 Methods for chemical analysis of iron, steel and alloy - The extraction-absorption catalytic polarographic method for the determination of manganese content

GB/T 223.60 Methods for chemical analysis of iron, steel and alloy - The perchloric acid dehydration gravimetric method for the determination of silicon content

GB/T 223.61 Methods for chemical analysis of iron, steel and alloy - The ammonium phosphomolybdate volumetric method for the determination of phosphorus content

GB/T 223.68 Methods for chemical analysis of iron, steel and alloy - The potassium iodate titration method after combustion in the pipe furnace for the determination of sulfur content

GB/T 223.69 Iron, steel and alloy - Determination of carbon contents - Gas-volumetric method after combustion in the pipe furnace

GB/T 228.1 Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 230.1 Metallic materials - Rockwell hardness test - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)

GB/T 231.1 Metallic materials - Brinell hardness test - Part 1: Test method

GB/T 232 Metallic materials - Bend test

GB/T 247 General rule of package, mark and certification for steel plates (sheets) and strips

GB/T 708-2006 Dimension, shape, weight and tolerance for cold-rolled steel plates and sheets

GB/T 2975 Steel and steel products - Location and preparation of test pieces for mechanical testing

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

GB/T 4340.1 Metallic materials - Vickers hardness test - Part 1: Test method

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

GB/T 11170 Stainless steel - Determination of multi-element contents - Spark discharge atomic emission spectrometric method (routine method)

GB/T 17505 Steel and steel products - General technical delivery requirements

g) general designation of unevenness, PF.A;

h) higher designation of unevenness, PF.B;

i) general precision of camber, PC.A;

j) higher precision of camber, PC.B.

4 Order content

Contracts or orders placed under this Standard shall include the following:

a) standard number;

b) product name;

c) steel designation or unified digital code;

d) dimension and precision;

e) weight (amount) of delivery;

f) surface processing type;

g) edge state;

h) delivery state;

i) items or indicators, in the standard, that shall be agreed upon between the supply and demand parties and specified in the contract. If not specified, they shall be selected by the supply party;

j) other special requirements, proposed by the demand party, that shall be agreed upon between the supply and demand parties and specified in the contract.

5 Dimension, shape, weight and tolerances

5.1 Dimension and tolerances

5.1.1 Dimension range of steel plates, sheets and strips

The nominal dimension range of steel plates, sheets and strips is shown in Table 1. The recommended nominal dimension shall comply with the specifications of 5.2 in GB/T 708-2006. According to the requirements of the demand party, and agreed upon between both parties, it may supply products

			of lubricant on the steel plate (sheet) surface during deep drawing. This surface is suitable for processing deep-drawn parts, but these parts need to be polished after molding
2B surface	Cold rolling, heat treatment, pickling or descaling, bright processing	Smoother than 2D surface	On the basis of the 2D surface, the heat-treated and descaled steel plate (sheet) is smoothed with a polishing roller with a small reduction amount. It is the most commonly used surface processing. Except extremely complex deep drawing, it can be used for any purpose
BA surface	Cold rolling, bright annealing	Smooth, bright, reflective	Bright annealing is performed in a controlled atmosphere furnace after cold rolling. Dry hydrogen or a mixture of dry hydrogen and dry nitrogen is usually used to prevent oxidation during annealing. It is also a commonly used surface processing for post process reprocessing
3# surface	Brush or matte finish on one or both sides	Non-directional texture, not reflective	The demand party can specify the designation or surface roughness of the polishing tape. Due to the different designations or surface roughness of the polishing tape, the surface presents different conditions. This surface is suitable for applications where the extended product needs further processing. If the product made of steel plate (sheet) or strip is not subjected to additional processing or polishing, 4# surface is recommended.
4# surface	General-purpose polishing on one or both sides	Non-directional texture, reflective	After rough grinding, coarse grinding is performed with an abrasive material having a grain size of 120# to 150# or finer. This material is widely used in restaurant equipment, kitchen equipment, storefronts, dairy equipment, etc.
6# surface	Matt satin finishing on one or both sides, Tampico grinding	Matted, non-directional texture	The surface reflectivity is poorer than that of the 4# surface. It is made from 4# surface-treated steel plates (sheets) in a media of medium-sized abrasives and oils through Tampico brushing. It is suitable for buildings and decorations that do not require gloss. The grinding granularity can be specified by the demand party
7# surface	High gloss surface processing	Smooth, highly reflective	It is rubbed with a good base surface, but the surface wear marks cannot be eliminated. This

ferrite, non-destructive testing. The specific content is agreed upon between the supply and demand parties.

7 Test methods

7.1 Test methods for chemical composition

The test methods for chemical composition of steel shall comply with the specifications of GB/T 223.3, GB/T 223.4, GB/T 223.5, GB/T 223.8, GB/T 223.9, GB/T 223.11, GB/T 223.16, GB/T 223.18, GB/T 223.19, GB/T 223.23, GB/T 223.25, GB/T 223.26, GB/T 223.28, GB/T 223.33, GB/T 223.36, GB/T 223.40, GB/T 223.53, GB/T 223.58, GB/T 223.60, GB/T 223.61, GB/T 223.68, GB/T 223.69, GB/T 11170, GB/T 20123, GB/T 20124.

7.2 Inspection items, sampling methods and positions, sampling volume and test methods of steel plates, sheets and strips

The inspection items, sampling methods and positions, sampling volume and test methods of each batch of steel plates, sheets and strips shall comply with the specifications of Table 38.

Table 38 -- Inspection items, sampling methods and positions, sampling volume and test methods of steel plates, sheets and strips

No.	Inspection item	Sampling method and position	Sampling volume	Test method
1	Chemical composition	According to GB/T 20066	1	See 7.1
2	Tensile test	According to GB/T 2975	1	GB/T 228.1, YB/T 4334
3	Bending test	According to GB/T 2975	1	GB/T 232
4	Hardness	Any sheet or any coil	1	GB/T 230.1, GB/T 231.1, GB/T 4340.1
5	Corrosion resistance	According to GB/T 4334	According to GB/T 4334	GB/T 4334
6	Dimension, shape	—	Sheet by sheet or coil by coil	7.3 of this Standard
7	Surface quality	—	Sheet by sheet or coil by coil	Visual inspection

7.3 Measurement methods for dimension and shape

7.3.1 Measurement of dimension

7.3.1.1 Measurement of thickness

Annex C

(informative)

Heat treatment system for stainless steel

The heat treatment system for stainless steel is shown in Table C.1 ~ Table C.5.

Table C.1 -- Heat treatment system for austenitic steel

Unified digital code	Steel designation	Heat treatment temperature and cooling method
S30110	12Cr17Ni7	≥ 1040 °C water cooling or rapid cooling by other methods
S30103	022Cr17Ni7	≥ 1040 °C water cooling or rapid cooling by other methods
S30153	022Cr17Ni7N	≥ 1040 °C water cooling or rapid cooling by other methods
S30210	12Cr18Ni9	≥ 1040 °C water cooling or rapid cooling by other methods
S30240	12Cr18Ni9Si3	≥ 1040 °C water cooling or rapid cooling by other methods
S30408	06Cr19Ni10	≥ 1040 °C water cooling or rapid cooling by other methods
S30403	022Cr19Ni10	≥ 1040 °C water cooling or rapid cooling by other methods
S30409	07Cr19Ni10	≥ 1095 °C water cooling or rapid cooling by other methods
S30450	05Cr19Ni10Si2CeN	≥ 1040 °C water cooling or rapid cooling by other methods
S30458	06Cr19Ni10N	≥ 1040 °C water cooling or rapid cooling by other methods
S30478	06Cr19Ni9NbN	≥ 1040 °C water cooling or rapid cooling by other methods
S30453	022Cr19Ni10N	≥ 1040 °C water cooling or rapid cooling by other methods
S30510	10Cr18Ni12	≥ 1040 °C water cooling or rapid cooling by other methods
S30908	06Cr23Ni13	≥ 1040 °C water cooling or rapid cooling by other methods
S31008	06Cr25Ni20	≥ 1040 °C water cooling or rapid cooling by other methods
S31053	022Cr25Ni22Mo2N	≥ 1040 °C water cooling or rapid cooling by other methods
S31252	015Cr20Ni18Mo6CuN	≥ 1150 °C water cooling or rapid cooling by other methods
S31608	06Cr17Ni12Mo2	≥ 1040 °C water cooling or rapid cooling by other methods
S31603	022Cr17Ni12Mo2	≥ 1040 °C water cooling or rapid cooling by other methods
S31609	07Cr17Ni12Mo2	≥ 1040 °C water cooling or rapid cooling by other methods
S31668	06Cr17Ni12Mo2Ti	≥ 1040 °C water cooling or rapid cooling by other methods
S31678	06Cr17Ni12Mo2Nb	≥ 1040 °C water cooling or rapid cooling by other methods
S31658	06Cr17Ni12Mo2N	≥ 1040 °C water cooling or rapid cooling by other methods
S31653	022Cr17Ni12Mo2N	≥ 1040 °C water cooling or rapid cooling by other methods
S31688	06Cr18Ni12Mo2Cu2	1010 °C ~ 1150°C water cooling or rapid cooling by other methods
S31782	015Cr21Ni26Mo5Cu2	1030 °C ~ 1180 °C water cooling or rapid cooling by other methods
S31708	06Cr19Ni13Mo3	≥ 1040 °C water cooling or rapid cooling by other methods
S31703	022Cr19Ni13Mo3	≥ 1040 °C water cooling or rapid cooling by other methods
S31723	022Cr19Ni16Mo5N	≥ 1040 °C water cooling or rapid cooling by other methods

Unified digital code	Steel designation	Heat treatment temperature and cooling method
S11348	06Cr13Al	780 °C ~ 830 °C rapid cooling or slow cooling
S11163	022Cr11Ti	800 °C ~ 900 °C rapid cooling or slow cooling
S11173	022Cr11NbTi	800 °C ~ 900 °C rapid cooling or slow cooling
S11213	022Cr12Ni	700 °C ~ 820 °C rapid cooling or slow cooling
S11203	022Cr12	700 °C ~ 820 °C rapid cooling or slow cooling
S11510	10Cr15	780 °C ~ 850 °C rapid cooling or slow cooling
S11710	10Cr17	780 °C ~ 800 °C air cooling
S11763	022Cr17NbTi	780 °C ~ 950 °C rapid cooling or slow cooling
S11790	10Cr17Mo	780 °C ~ 850 °C rapid cooling or slow cooling
S11862	019Cr18MoTi	800 °C ~ 1050 °C rapid cooling
S11873	022Cr18Nb	800 °C ~ 1050 °C rapid cooling
S11972	019Cr19Mo2NbTi	800 °C ~ 1050 °C rapid cooling
S12791	008Cr27Mo	900 °C ~ 1050 °C rapid cooling
S13091	008Cr30Mo2	800 °C ~ 1050 °C rapid cooling
S12182	019Cr21CuTi	800 °C ~ 1050 °C rapid cooling
S11973	022Cr18NbTi	780 °C ~ 950 °C rapid cooling or slow cooling
S11863	022Cr18Ti	780 °C ~ 950 °C rapid cooling or slow cooling
S12362	019Cr23MoTi	850 °C ~ 1050 °C rapid cooling
S12361	019Cr23Mo2Ti	850 °C ~ 1050 °C rapid cooling
S12763	022Cr27Ni2Mo4NbTi	950 °C ~ 1150 °C rapid cooling
S12963	022Cr29Mo4NbTi	950 °C ~ 1150 °C rapid cooling
S11573	022Cr15NbTi	780 °C ~ 1050 °C rapid cooling or slow cooling
S11882	019Cr18CuNb	800 °C ~ 1050 °C rapid cooling

Table C.4 -- Heat treatment system for martensitic steel

Unified digital code	Steel designation	Annealing	Quenching	Tempering
S40310	12Cr12	About 750 °C rapid cooling or 800 °C ~ 900 °C slow cooling	—	—
S41008	06Cr13	About 750 °C rapid cooling or 800 °C ~ 900 °C slow cooling	—	—
S41010	12Cr13	About 750 °C rapid cooling or 800 °C ~ 900 °C slow cooling	—	—
S41595	04Cr13Ni5Mo	—	—	—
S42020	20Cr13	About 750 °C rapid cooling or 800 °C ~ 900	—	—

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