



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

GB/T 37612-2019

Corrosion-resistant alloy wires for welding

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1 Scope

This Standard specifies the terms and definitions, ordering content, dimensions, shape, technical requirements, test methods, inspection rules, packaging, marking, and quality certificate of nickel-based, iron-nickel-based corrosion-resistant alloy wires for welding.

This Standard applies to nickel-based and iron-nickel-based corrosion-resistant alloy solid bare wires for welding (hereinafter referred to as wires for welding)

used as filler metals such as consumable-electrode inert-gas-shielded arc welding, tungsten-electrode inert-gas-shielded arc welding, plasma arc welding, and submerged-arc welding.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

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 223.9 Iron, steel and alloy - Determination of aluminium content -Chrome azurol S photometric method

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

GB/T 223.14 Methods for Chemical Analysis of Iron, Steel and Alloy - The N-Benzoyl-N-Phenylhydroxylamine Extraction Photometric Method for the Determination of Vanadium Content

GB/T 223.17 Methods for chemical analysis of iron steel and alloy - The dianthylpyrylmethane 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 223.22 Methods for chemical analysis of iron, steel and alloy - The nitroso-R-salt spectrophotometric method for the determination of cobalt content

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 223.28 Methods for chemical analysis of iron, steel and alloy - The alpha-benzoin oxime gravimetric method for the determination of molybdenum content

GB/T 223.38 Methods for chemical analysis of iron, steel and alloy - The anion-exchange separation-gravimetric method for the determination of niobium content

GB/T 223.43 Iron, steel and alloy - Determination of tungsten content -Gravimetric method and spectrophotometric method

GB/T 223.59 Iron, steel and alloy - Determination of phosphorus content -Bismuth phosphomolybdate blue spectrophotometric method and antimony phosphomolybdate blue spectrophotometric method

GB/T 223.63 Methods for chemical analysis of iron, steel and alloy - The sodium (potassium) periodate photometric method for the determination of manganese content

GB/T 223.73 Iron steel and alloy - Determination of iron contents - Titanium trichloride-potassium dichromate titration method

GB/T 223.79 Iron and steel - Determination of multi-element contents - X-ray fluorescence spectrometry (Routine method)

GB/T 223.85 Steel and iron - Determination of sulfur content - Infrared absorption method after combustion in an induction furnace

GB/T 223.86 Steel and iron - Determination of total carbon content - Infrared absorption method after combustion in an induction furnace

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

GB/T 2975-2018 Steel and Steel Products - Location and Preparation of Test Pieces for Mechanical Testing

6 Technical requirements

6.1 Designation and chemical composition The designation and chemical composition (product analysis) of the alloy shall comply with the requirements of Table 1. For the comparison of domestic and foreign designations and unified digital codes for wires for welding, refer to

Appendix B. 6.2 Smelting method

The alloy is smelted by vacuum induction furnace or by vacuum induction furnace plus electroslag remelting. Through consultation between the supplier and the purchaser, other smelting methods which can meet the requirements of this Standard may also be used.

6.3 Delivery state The wire for welding is delivered in a cold-drawn or solution-treated state. The delivery state shall be indicated in the contract; those not indicated shall be delivered in the cold-drawn state. For recommended solution treatment temperatures, see Appendix C.

6.4 Surface quality The surface quality of the wires for welding shall comply with the provisions of

GB/T 37609.

6.5 Special requirements According to the requirements of the purchaser, through consultation between the supplier and the purchaser, and indicated in the contract, the wires for welding of the following special requirements may be provided:

- a) Wires for welding with designations and chemical composition other than those listed in Table 1 may be provided;
- b) Tighten chemical composition or limit the content of residual elements;
- c) Detect mechanical properties (see Appendix D);
- d) Other.

Appendix B (Informative) Characteristics and use of corrosion-resistant alloy wires for welding

The characteristics and use of corrosion-resistant alloy wires for welding are shown in Table B.1.

Table B.1 -- Characteristics and use of corrosion-resistant alloy wires for welding

Table

1 No.

ISC codes Alloy designations Characteristics and use of wires for welding

2 W58825 HNS1402 Nickel-iron-chromium-molybdenum-copper-based wires for welding. The nominal composition (mass fraction %) is 42Ni, 30Fe, 21Cr, 3Mo, 2Cu. It is suitable for self-welding of NS1402 and ISCH08825. USE tungsten-electrode gas shielded welding and metal arc gas shielded welding.

3 W58021 HNS1403

Nickel-chromium-molybdenum-copper-based wires for welding.

The nominal composition (mass fraction %) is 20Cr, 34Ni, 2.5Mo, 3.5Cu. The addition of Nb improves the resistance to intergranular corrosion. It is mainly used for the welding of matrix metals of similar composition. These matrix metals are intended to be used in environments resistant to serious corrosion of a wide range of chemicals containing sulfur, sulfuric acid and its salts. It can weld both NS1403 cast alloy and NS1403 forged alloy, without heat treatment after welding.

When the wire for welding is changed to Nb-free, it may be used for repair welding of Nb-free castings; but with this modified composition, solution annealing treatment after welding is necessary.

5 W56601 HNS3103 Nickel-chromium-based wires for welding. The nominal composition (mass fraction %) is 61Ni, 23Cr, 14Fe, 1.4Al. It is used for self-welding of NS3103 and ISCH06601 and welding with other high-temperature composition alloys. USE tungsten-electrode gas shielded welding method. It may be used in harsh environments where exposure temperatures may exceed 1150 °C.

Table B.1 (continued)

Table

1 No.

ISC codes Alloy designations Characteristics and use of wires for welding

15 W10276 HNS3304 Nickel-chromium-molybdenum-based wires for welding. The nominal composition (mass fraction %) is 57Ni, 16Cr, 15.5Mo, 5.5Fe, 4W. It is used for self-welding