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High strength and low expansion alloy

高强度低膨胀合金

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Standardization Administration of the PRC.

Table of Contents

High strength and low expansion alloy

1 Scope

This Standard specifies the order content, dimension, shape, weight, technical requirements, test methods, inspection rules, packaging, marking and quality certification of high strength and low expansion alloy.

This Standard applies to high strength and low expansion alloy bars, flats and plates (hereinafter referred to as alloys) for high-load, high-precision load-bearing components.

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

GB/T 223.17 Methods for chemical analysis of iron, steel and alloy - The diantipyrylmethane photometric method for the determination of titanium 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 223.20 Methods for chemical analysis of iron steel and alloy - The Potentiometric titration 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 223.62 Methods for chemical analysis of iron, steel and alloy - The butyl acetate extraction photometric method for the determination of phosphorus content

GB/T 223.64 Iron, steel and alloy - Determination of manganese content - Flame atomic absorption spectrometric method

and stereology

GB/T 20066 Steel and iron - Sampling and preparation of samples for the determination of chemical composition

GB/T 20123 Steel and iron - Determination of total carbon and sulfur content - Infrared absorption method after combustion in an induction furnace (routine method)

GB/T 20125 Low-alloy steel - Determination of multi-element contents - Inductively coupled plasma atomic emission spectrometric method

GB/T 21834 Medium and low alloy steel - Determination of the distribution of multi-element contents - Original position statistic distribution analysis method

GB/T 22368 Low-alloy steel - Determination of multi-element contents - Glow discharge optical emission spectrometry (Routine method)

GB/T 38939 Nickel-based alloy - Determination of multi-element contents - Spark discharge atomic emission spectrometric method (routine method)

YB/T 4377 Electrolytic polishing method of metallic specimens

YB/T 5242 General rules of packaging, marking and quality certification for precision alloys

3 Order content

The contract or order ordered according to this Standard shall at least include the following contents:

a) Number of this Standard;

b) Product name;

c) Designation;

d) Delivery status;

e) Dimension and allowable deviation;

f) Weight or quantity;

g) Other special requirements.

B.3.1.2 For wires with a diameter of less than 2 mm, it is recommended to cut 3~5 samples.

B.3.1.3 For tubes with an outer diameter of over 80 mm, for different wall thicknesses, the sampling method shall be negotiated by both parties.

B.3.1.4 For the convenience of sample preparation or inspection, the same sample is allowed to be split into small samples of 10 mm×10 mm. The total inspection section area is the sum of the area of the small samples.

B.3.1.5 In the same delivery lot, samples with large diameter, side length or thickness are allowed to replace samples with smaller diameter, side length or thickness for inspection.

B.3.1.6 According to needs, through negotiation between the supplier and the purchaser, other sections (such as longitudinal sections) that are different from the indicated locations can be taken for inspection.

B.3.1.7 The cutting, marking, regulation, cleaning, and inlay of the sample shall be carried out in accordance with the relevant regulations of GB/T 13298.

B.3.1.8 The heat treatment of sample is carried out in accordance with the product standard of each alloy designation.

B.3.2 Sample grinding

B.3.2.1 The grinding of the sample is carried out in accordance with the regulations of GB/T 13298.

B.3.2.2 Small-dimension wires, tubes, strips, bars and small irregular-shape

soaked with etching agent, until the surface becomes dull.

B.3.4.3 In the case of mutual agreement, after polishing, the sample is allowed to be directly frozen for phase transition inspection.

B.4 Instruments and reagents

B.4.1 Dewar flask (thermos flask).

B.4.2 Low temperature test chamber, which meets the relevant regulations of GB/T 2423.1, GB/T 2424.5 or GB/T 10592.

B.4.3 100×~400× or more advanced optical microscope, with CCD image acquisition function; equipped with image analysis software that can be used for manual or automatic measurement.

B.4.4 Acetone (or absolute ethanol).

B.4.5 Carbon dioxide (dry ice).

B.4.6 Low temperature thermometers that meet the requirements of GB/T 16839.1; or other types of low temperature thermometers that meet the requirements of general standards.

B.5 Test

B.5.1 Acquisition of low temperature environment

B.5.1.1 -60 °C environment can be obtained by using a mixed coolant of acetone or absolute ethanol and dry ice prepared in a Dewar flask, after temperature adjustment. Or use a low temperature test chamber that meets the standard.

B.5.1.2 -78.5 °C environment can be obtained by using a cooling mixture of acetone or absolute ethanol and excess dry ice prepared in a Dewar flask. Or use a low temperature test chamber that meets the standard.

B.5.1.3 The deep low temperature environment of -196 °C is obtained by soaking in liquid nitrogen.

B.5.1.4 When other test equipment or refrigerants are used for phase transition test under special negative temperature environment, the test preparation shall ensure that the relevant standards and safety regulations are met. It shall be carried out under the test conditions approved by both parties.

B.5.2 Freezing treatment of samples

PUT the polished or corroded sample into a Dewar flask or low temperature test

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