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Carbon steel-fiber reinforced plastic clad bars for reinforcement concrete

钢筋混凝土用碳素钢-纤维增强复合材料符合钢筋

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Carbon steel-fiber reinforced plastic clad bars for reinforcement concrete

1 Scope

This Standard specifies the terms and definitions, classification, designation, size, shape, weight and allowable deviations, technical requirements, test methods, inspection rules, packaging, marking and quality certification of carbon steel-fiber reinforced plastic clad bars (hereinafter referred to as clad bars).

This Standard applies to plain and ribbed bars which are made of carbon steel-fiber reinforced plastics for reinforcement concrete.

2 Normative references

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

GB/T 222, Permissible tolerances for chemical composition of steel products

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

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

GB/T 223.12, Methods for chemical analysis of iron, steel and alloy - The sodium carbonate separation-diphenyl carbazide photometric method for the determination of chromium content

GB/T 223.14, Methods for chemical analysis of iron, steel and alloy - The N-benzoy-N-phenylhydroxylamine extraction photometric method for the determination of vanadium 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 17505, Steel and steel products - General technical delivery requirements

GB/T 20018, Metallic and non-metallic coatings - Measurement of thickness - Beta backscatter methods

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 20124, Steel and iron - Determination of nitrogen content - Thermal conductimetric method after fusion in a current of inert gas

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

GB/T 25826-2010, Epoxy-coated steel for the reinforcement of concrete

GB/T 26743, Fiber reinforced composite bars for civil engineering

GB/T 28900, Test methods of steel for reinforcement of concrete

JGJ 18, Specification for welding and acceptance of reinforcing steel bars

JGJ 107, Technical specification for mechanical splicing of steel reinforcing bars

YB/T 081, Rule for rounding off of numerical values and judgment of testing values for technical standards of metallurgy

3 Terms and definitions

Terms and definitions determined by GB/T 1499.1, GB/T 1499.2, GB/T 26743 and the following ones are applicable to this document.

3.1 Carbon steel-fiber reinforced plastic clad bars

Clad bars, whose surface layer is fiber reinforced plastics and core is hot-rolled steel bars, which is compounded through processes such as compression molding, bonding, high-pressure injection, high-temperature treatment.

3.2 Base metal

The base metal of clad bars is mainly the hot-rolled steel bar that is used to withstand the structural strength, which is divided into plain bars and ribbed bars.

c) Clad bar designation (including the cladding designation);

d) Clad bar nominal diameter, length (or disk diameter) and weight (or quantity, or disk weight);

e) Special requirements.

5 Size, shape, weight and allowable deviation

5.1 Nominal diameter range and recommended diameter

The nominal diameter of hot-rolled plain-fiber reinforced plastic clad bars is 6 mm ~ 22 mm; the nominal diameter of hot-rolled ribbed-fiber reinforced plastic clad bars is 6 mm ~ 50 mm; the recommended nominal diameters of clad bars are 6 mm, 8 mm, 10 mm, 12 mm, 14 mm, 16 mm, 18 mm, 20 mm, 22 mm, 25 mm, 28 mm, 32 mm, 36 mm, 40 mm and 50 mm.

5.2 Size, shape and allowable deviation

The size, shape and allowable deviation of the base metal of hot-rolled plain-fiber reinforced plastic clad bars shall meet the requirements of GB/T 1499.1. The size, shape and allowable deviation of the base metal of hot-rolled ribbed-fiber reinforced plastic clad bars shall meet the requirements of GB/T 1499.2. Special requirements shall be negotiated by both parties.

5.3 Cladding thickness

The cladding thickness size range is 0.07 mm ~ 1.0 mm.

5.4 Weight

It is delivered at actual weight.

6 Technical requirements

6.1 Materials

6.1.1 The chemical composition and carbon equivalent of the base metal of clad bars shall comply with the relevant regulations of GB/T 1499.1 and GB/T 1499.2.

6.1.2 The chemical composition of the base metal of clad bars shall be indicated in the quality certificate.

6.1.3 The steel base metal which is used to make clad bars shall avoid oil, grease or paint pollution. Before compounding, it shall be visually confirmed that the steel bar does not have sharp edges, burrs or other surface defects

6.5 Connection performance

6.5.1 Before the clad bars are connected, the surface cladding of the connecting part shall be removed first; the position after the connection shall be sealed with epoxy resin. Refer to the requirements of JGJ 18, JGJ 107 and other relevant standards for the quality inspection and acceptance of the welding, mechanical connection process and joints of clad bars.

6.5.2 The clad bars can also be connected by other connection methods. The technical requirements and test methods of the test shall be negotiated and determined by the supplier and the buyer.

6.5.3 The welding process of HRB500FC and HRB500FCE clad bars shall be determined through experiments.

6.6 Surface quality

There shall be no defects that affect the performance on the surface of the clad bars; the surface bumps of the ribbed clad bars shall not exceed the height of the transverse ribs.

7 Test method

7.1 Dimension measurement and cladding thickness

7.1.1 The height of the transverse rib of the ribbed clad bar is measured by the method of measuring the average value of the center height of the transverse ribs on both sides of the same section, that is, measuring the maximum outer diameter of the clad bar, and subtracting the inner diameter at the point; half the obtained value is the rib height at that point, which shall be accurate to 0.1 mm. When it is necessary to calculate the relative rib area, a quarter of the height of the measured transverse rib shall be added.

7.1.2 The transverse rib spacing of ribbed clad bars shall be measured by measuring the average rib spacing. That is, measure the center distance between the first and the eleventh transverse ribs on one side of the clad bar. This value is divided by 10 to be the transverse rib spacing, which shall be accurate to 0.1 mm.

7.1.3 For the inspection of the cladding thickness, the cladding thickness can be measured in accordance with the method of GB/T 20018. Each thickness record value is the average of 3 adjacent thickness measurements. Measurements shall be made on opposite sides of the steel bar; at least 5 thickness records at approximately uniform intervals along each side of the steel bar shall be obtained (at least 10 records for each sample).

7.2 Residual amount of oxide scale

The residual amount of oxide scale shall be carried out in accordance with A.2.1 in GB/T 25826-2010.

7.3 Average roughness

The average roughness shall be carried out in accordance with A.2.2 in GB/T 25826-2010.

7.4 Chloride attachment

The chloride attachment shall be carried out in accordance with A.2.3 in GB/T 25826-2010.

7.5 Derusting grade

The derusting grade shall be carried out in accordance with A.2.4 in GB/T 25826-2010.

7.6 Resistance to chemical corrosion

The resistance to chemical corrosion shall be carried out in accordance with A.3.1 in GB/T 25826-2010.

7.7 Cathodic disbonding

The cathodic disbonding shall be carried out in accordance with A.3.2 in GB/T 25826-2010.

7.8 Salt fog test

The salt fog test shall be carried out in accordance with A.3.3 in GB/T 25826-2010.

7.9 Resistance to chloride penetration

The resistance to chloride penetration shall be carried out in accordance with A.3.4 in GB/T 25826-2010.

7.10 Numerical rounding

The numerical rounding and judgment of the inspection result shall be in accordance with YB/T 081.

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