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The grouting coupler for rebars splicing

钢筋连接用灌浆套筒

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard was proposed by the Institute of Standards and Quotas of the Ministry of Housing and Urban-Rural Development of the People's Republic of China.

This Standard shall be under the jurisdiction of the Standardization Technical Committee on Construction Structure of the Ministry of Housing and Urban-Rural Development.

The drafting organizations of this Standard: China Academy of Building Research, Guangxi Construction Group Second Construction Engineering Co., Ltd., Beijing Yugou Co., Ltd., Langfang CABR Construction Machinery Technology Co., Ltd., Central Research Institute of Building and Construction Co., Ltd., CABR Technology Co., Ltd., Zhongtai Construction Group Co., Ltd., Beijing Building Construction Research Institute Co., Ltd., Peifeng Construction Engineering (Shanghai) Co. Ltd., Zhejiang Construction Engineering Co., Ltd. and Baoye Group Zhejiang Construction Industry Institute Co., Ltd..

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The grouting coupler for rebars splicing

1 Scope

This Standard specifies the terms and definitions, classification and types, requirements, test method, inspection rules and marking, packaging, transportation and storage of the grouting coupler for rebars splicing (hereinafter referred to as the grouting coupler).

This Standard applies to the coupler for grouting and splicing hot-rolled ribbed or remained heat treatment rebars of the diameter 12 mm to 40 mm in reinforced concrete.

2 Normative references

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

GB/T 197 General Purpose Metric Screw Threads – Tolerances

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

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

GB/T 699 Quality carbon structural steels

GB/T 1348 Spheroidal graphite iron castings

GB/T 1499.2 Steel for the reinforcement of concrete – Part 2: Hot rolled ribbed bars

GB/T 1591 High strength low alloy structural steels

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

GB/T 3077 Alloy structure steels

GB/T 8162 Seamless steel tubes for structural purposes

GB/T 9174 General specification for transport packages of general cargo

GB/T 9441 Metallographic test for spheroidal graphite cast iron

GB/T 13014 Remained heat treatment ribbed steel bars for the reinforcement of concrete

GB/T 13298 Inspection methods of microstructure for metals

JGJ 107 Technical specification for mechanical splicing of steel reinforcing bars

3 Terms and definitions

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

3.1

the grouting coupler

the metal coupler for splicing of rebars through the force transferring impact of cement-based grouting material, which is usually made by the casting process or mechanical process

3.2

the whole grouting coupler

the grouting coupler which splices rebars by grouting at both ends of the splice

3.3

the grouting coupler with half thread end

the grouting coupler with one end of the splice spliced by grouting and the other end spliced by non-grouting; the other end is usually spliced by thread

3.4

the grouting coupler with directly rolling thread end

the grouting coupler with half thread end with the non-grouting splicing end of the splice splicing rebars by directly rolling thread end

3.5

the grouting coupler with rolling thread end after stripping rib

the grouting coupler with half thread end with the non-grouting splicing end of the splice by rib-stripped rolling straight thread

3.6

the grouting coupler with thread end after upsetting

b) the first type change of the grouting coupler with rolling thread end after stripping rib, which is made by mechanical processing and splices rebars of standard yield strength 500 MPa and diameter 36 for the grouting end or 32 mm for the non-grouting end, is expressed as: GTJB5 36/32A.

5 Requirements

5.1 General provisions

5.1.1 The production of the grouting coupler shall meet the requirements of product design.

5.1.2 The design of yield bearing capacity and tensile bearing capacity, after reckoning in the maximum negative tolerances at the positions of the middle of the whole grouting coupler and the discharging hole of the grouting coupler with half threaded end, is specified in JGJ 107.

5.1.3 The length of the grouting coupler shall be decided by tests and the length of the grouting splicing end is preferably not less than 8 times of the diameter of rebars; the length of installation and adjustment of rebars shall be reserved on both sides of the middle axial anchor point, not less than 10 mm for the prefabricated end and not less than 20 mm for the on-site assembly end.

5.1.4 The number of shear slots shall meet the specifications of Table 1; the axial thickness of the boss on both sides of shear slots shall not be less than 2 mm.

Table 1 Numbers of shear slots

Diameter of rebars spliced/mm	12 to 20	22 to 32	36 to 40
Number of shear slots/nos	≥ 3	≥ 4	≥ 5

5.1.5 The wall thickness of the grouting coupler mechanically processed shall not be less than 3 mm; the wall thickness of the grouting coupler cast shall not be less than 4 mm.

5.1.6 The diameter of the through-hole at the splice of the threaded end and the grouting end of the grouting coupler with half threaded end is preferably not too large; the difference between the minor diameter of thread and the diameter of through-hole shall not be less than 2 mm; the length of through-hole shall not be less than 3 mm.

5.2 Material properties

5.2.1 The grouting coupler cast is preferably made of spheroidal graphite cast iron; the grouting coupler mechanically processed is preferably made of quality carbon structural steel, high strength low alloy structural steel, alloy structural steel or other steels which are verified by the splice type test and conform to the requirements.

5.2.2 For the grouting coupler made of spheroidal graphite cast iron, its material shall

	the anchorage section and nominal diameter of rebars/mm		
7	Accuracy of straight thread	-	Grade H in GB/T 197

5.4 Appearance

5.4.1 The inner and outer surfaces of the grouting coupler shall be free from quality defects which are adverse to its usability, such as slag inclusions, cold shuts, sand holes, shrinkage holes and cracks.

5.4.2 The surface of the grouting coupler mechanically processed shall be free from cracks or other defects adverse to the properties of the splice; the edges of the end surfaces and outer surfaces shall be free from sharp corners and burrs.

5.4.3 The outer surface of the grouting coupler shall be marked legibly.

5.4.4 The surface of the grouting coupler shall be free from rust.

5.5 Mechanical properties

The grouting coupler shall be used in conjunction with the grouting material; the tensile strength of the rebars splice spliced with the grouting coupler shall meet the specifications of the splice of grade I in JGJ 107.

6 Test method

6.1 Material properties

6.1.1 Mechanical properties

The yield strength, tensile strength and percentage elongation after fracture of the main testing materials.

6.1.1.1 For the material properties of the grouting coupler cast, use the separately cast test block method for sampling; for the material properties of the grouting coupler mechanically processed, use the raw materials for sampling.

6.1.1.2 Preparation of test pieces

For the test pieces of casting materials, use the separately cast test blocks; the preparation of test pieces is specified in GB/T 1348. The sampling and sample preparation for round steel or steel are specified in GB/T 2975.

6.1.1.3 Test method

It is specified in GB/T 228.1.

6.1.2 Rate of spheroidization

Visual inspection.

6.4 Mechanical properties

The mechanical property test of the grouting coupler shall be carried out on the rebars splice test pieces foe splicing the grouting coupler and the matched grouting material; the test method for the tensile strength of splice is specified in JGJ 107.

7 Inspection rules

The inspection is divided into ex-factory inspection and type inspection.

7.1 Ex-factory inspection

7.1.1 Inspection items

The inspection items are specified in 5.2, 5.3 and 5.4.

7.1.2 Batching rules

The material of the same steel grade, the same specification and the same furnace (batch) number is an acceptance batch for the material property test.

For dimensional deviations and appearance, 1 000 grouting couplers produced successively of the same material, the same furnace (batch) number, the same type and the same specification are an acceptance batch; when it is less than 1 000 grouting couplers, it can still be an acceptance batch.

7.1.3 Sampling quantity and method

Take two test pieces randomly from each batch for the material property test. For dimensional deviations and appearance inspection, take 10% randomly from each batch; when the one-time inspection result is a pass for 10 consecutive acceptance batches, the sampling quantity for dimensional deviations and appearance inspection can be reduced from 10% to 5%.

7.1.4 Judgement rules

If 2 test pieces are up to standard in a material property test, the material property of the batch of grouting couplers is a pass. If 1 test piece is not up to standard, double the test pieces for a re-test: it can still be judged to be a pass for the material property of the batch of grouting couplers if all results of the re-test are up to standard; if there is still 1 test piece not up to standard in the re-test, then the material property of the batch of grouting couplers is judged to be a fail.

If the percentage of pass is not less than 97% in the dimensional deviations and appearance test, the batch of grouting couplers are judged to be a pass. When it is less than 97%, double the test pieces of grouting couplers for a re-test: when the

c) the type of grouting coupler;

d) the quantity;

e) the weight;

f) the production batch number;

g) the production date; and

h) the manufacturer name, contact address and number and so on.

8.2 Packaging

8.2.1 The packaging of the grouting coupler is specified in GB/T 9174. The grouting coupler shall be packaged with carton, plastic woven bag or wooden box based on the specifications and batch numbers; the grouting couplers of different specifications and batch numbers shall not be mixed. Under normal conditions, cartons shall be used for packaging; the strength of cartons shall meet the requirements of transportation; packaging tape of sufficient strength shall be used to tie up the outside of cartons.

8.2.2 The grouting coupler shall be accompanied with a product quality certificate at the time of delivery (see Annex A for its format). The product quality certificate shall include the following information:

a) the product name;

b) the type of grouting coupler;

c) the production batch number;

d) the material grade;

e) the quantity;

f) the test conclusion;

g) the test compliance signature; and

h) the manufacturer name, contact address and number and so on.

8.2.3 When there are high moisture-proofing requirements, the grouting couplers shall be packaged one by one with moisture-proof paper before being enclosed in a wooden box.

8.3 Storage and transportation

8.3.1 Water-proofing and rain-proofing measures shall be taken during the transportation process of the grouting couplers.

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