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GB/T 20491-2017

Replacing GB/T 20491-2006

Steel slag powder used for cement and concrete

用于水泥和混凝土中的钢渣粉

Issued on: September 7, 2017 **Implemented on: June 1, 2018**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of the PRC

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Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009. This Standard replaces GB/T 20491-2006 "Steel slag powder used for cement and concrete". As compared with GB/T 20491-2006, in addition to editorial modifications, the main technical changes are as follows: - DELETE "products of steel slag powder combined with ground granulated blast furnace slag powder and fly ash" in the "Scope"; - DELETE the definitions of "comparison sample, test sample, comparison mortar, test mortar, activity index, fluidity ratio" in the "Terms and definitions"; - In the definition of steel slag powder, CHANGE "When grinding, it is allowed to add appropriate amount of gypsum in accordance with GB/T 5483 and cement grinding process admixture conforming to JC/T 667" to "When grinding, it is allowed to add cement grinding aid in accordance with GB/T 26748"; - For the specific surface of steel slag powder, "The primary and secondary specific surfaces are not less than 400 m2/kg" is changed to "The primary and secondary specific surfaces shall >=350 m2/kg" (SEE Table 1); - The density of steel slag powder is changed from "not less than

2.8 g/cm3" to ">=

3.2 g/cm3"; - The free calcium oxide content of steel slag powder is changed from "not more than 3.0%" to "<=4.0%"; - DELETE the definition and index of the basicity factor of steel slag powder; - ADD chloride ion content index of steel slag powder. The value is <=0.06%; - The fluidity ratio is changed from "not less than 90" to ">=95"; - In the soundness of steel slag powder, autoclave method is changed from "When the content of MgO in steel slag is more than 13%, it shall be qualified" to "6 h autoclave expansion rate

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<=0.50% (If the content of MgO in steel slag powder is not more than 5%, autoclave soundness may not be inspected)"; - The reference method for the determination of free calcium oxide content is changed from "YB/T 140 'Methods of chemical analysis of steel slag'" to "YB/T 4328 'Determination Method for Free Calcium Oxide Content in Steel Slag'"; Steel slag powder used for cement and concrete

1 Scope

China's national standard for ground steel slag used as a supplementary cementitious material in cement and concrete. It specifies the terms and definitions, the classification, the technical requirements, the test methods, the inspection rules, and the packaging, marking, transport and storage, and it applies to steel slag powder used in cement and in concrete. Steel slag is the slag from the steelmaking vessel, not from the blast furnace, and the distinction is the whole point of this standard. Blast furnace slag, quenched to a glass, is reliably hydraulic. Steel slag is cooled slowly, is crystalline, and is only weakly cementitious - and it carries a specific hazard that blast furnace slag does not: free lime and free magnesia. Both hydrate slowly and expand as they do, and expansion in hardened concrete is destructive. Steel slag used without control has caused failures that appeared months or years after placement, and that is why the soundness requirement is the central clause of the document rather than one of several. The standard therefore sets the soundness test and its limit, the free calcium oxide content, and the ageing or treatment implied by them, alongside the properties that determine whether the material is worth using at all: the specific surface area, since steel slag is hard to grind and its reactivity depends almost entirely on fineness; the activity index at defined ages, which states its contribution to strength relative to a control; the water demand ratio; the moisture, the sulfur trioxide content and the metallic iron content. Classification by activity grade lets the material be specified for the use it actually suits. Issued on 7 September 2017 and in force since 1 June 2018, it replaces GB/T 20491-2006.

This Standard specifies the terms and definitions, technical requirements, test methods, inspection rules, packing, marking, transport, and storage of steel slag powder used for cement and concrete. This Standard is applicable to steel slag powder used for cement and concrete.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the versions with the dates indicated are applicable to this document. For the undated references, the latest version (including all the amendments) are applicable to this document.

GB/T 176 Methods for chemical analysis of cement

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GB/T 208 Test method for determining cement density

GB/T 750 Autoclave method for soundness of Portland cement

GB/T 1346 Test methods for water requirement of normal consistency, setting time and soundness of the Portland cement

GB/T 2419 Test method for fluidity of cement mortar

GB/T 8074 Testing method for specific surface of cement - Blaine method

GB 8076 Concrete admixtures

GB/T 9774 Sacks for packing cement

GB/T 12573 Sampling method for cement

GB/T 17671 Method of testing cements - Determination of strength

GB/T 51003-2014 Technical code for application of mineral admixture YB/T 022 Steel slag used for cement YB/T 804 Terminology for iron and steel slag and treatment and utilization It shall be carried out according to GB/T 8074.

5.2 Density It shall be carried out according to GB/T 208.

5.3 Water content It shall be carried out according to Appendix C of GB/T 51003-2014.

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6.1 Numbering and sampling

6.1.1 Numbering - When the exit-factory inspection result is significantly different from the last type inspection.

6.4 Judgement rules

6.4.1 The products of which the inspection results meet the technical requirements of Table 1 are qualified.

6.4.2 The products of which the inspection results do not meet the technical requirements of Table 1 are unqualified. Except for the soundness index, if any of the items does not meet the requirements, double samples shall be re-taken, for reinspection of the non-conforming items. The result of the reinspection shall prevail in the assessment. The activity index, after reinspection, can be degraded to use. If the soundness is unqualified, it cannot be re-inspected and shall be as a non-conforming product.

6.4.3 If the type inspection result meets all the requirements of Table 1, the type inspection shall be judged as qualified. If the type inspection result does not meet any of the requirements in Table 1, the type inspection shall be judged as unqualified.

6.4.4 The contents of the inspection report shall include exit-factory inspection items and other technical requirements stipulated in the contract. When the user needs, the

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manufacturer shall, within 11 d from the date of delivery of steel slag powder, send the test results except the 28 d activity index. The 28 d activity index shall be supplementally reported within 32 d from the date of delivery of steel slag powder.

6.5 Delivery and acceptance

6.5.1 At the time of delivery, the quality acceptance of steel slag powder can be based on the inspection results of the physical samples taken; or be based on the inspection report of steel slag powder of the same number of the manufacturer. The method for acceptance shall be agreed upon by the supplier and the buyer and be stated in the contract or agreement. The supplier has the responsibility to inform the buyer of the method for acceptance. When there is no written contract or agreement, or the acceptance method is not specified in the contract or agreement, the supplier shall indicate on the invoice that "The inspection report of steel slag powder of the same number of the manufacturer is the basis for acceptance".

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