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Steel slag powder used for cement and concrete

用于水泥和混凝土中的钢渣粉

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Standardization Administration of the People's Republic of China.

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Foreword

This Standard is formulated by referring to ASTM C618:2000 (United States) *Standard specification for coal fly ash and raw or calcined natural pozzolan for use as a mineral admixture in concrete*, JIS A6201:1999 (Japan) *Coal fly ash for use in concrete*, ГОСТ 25818:1991 (Russia) *Coal fly ash of thermal power plant for use in concrete*, and GB/T 18046 (China) *Ground granulated blast furnace slag used for cement and concrete*, and combined with the production and use of steel slag powder in China.

The Appendix A of this Standard is normative.

Some of the elements of this Standard may be the subject of patent rights. The issuing authorities of this Standard do not undertake the responsibility for identifying any or all of such patent rights.

This Standard was proposed by China Iron and Steel Association.

This Standard shall be under the jurisdiction of the National Technical Committee for Standardization of Steel.

Responsible drafting organization of this Standard: Central Research Institute of Building and Construction of MCC Group.

Participating drafting organizations of this Standard: Steel Slag Branch of Hunan Valin South Environmental Science and Technology Co., Ltd, Steel Slag Comprehensive Utilization Co., Ltd of Magang (Group) Holding Company Limited (or Masteel), Metallurgical Slag Co., Ltd of WISCO, Beijing Jianyuanhe Special Cement Co., Ltd, Comprehensive Development Co., Ltd of Shanghai Baosteel Group Corporation, Zhejiang Haimu Steel and Iron Service Co., Ltd, Wuhan Green Metallurgical Slag Technology Development Co., Ltd, Hangzhou Jun'an Steel Slag and Building Material Manufacturing Co., Ltd, Wuxi Zhonghuan Steel Slag Utilization Co., Ltd, Slag Development Co., Ltd of Anshan Iron and Steel Group Corporation (or Ansteel), Steel Restructuring Plant of Angang Subsidiary Enterprise Company, and Shougang Group.

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Steel slag powder used for cement and concrete

1 Scope

This Standard specifies the terms and definitions, technical requirements, test methods, inspection rules, packaging, marks, transportation and storage of the steel slag powder used for cement and concrete.

This Standard applies to the production and inspection of the steel slag powder used for cement and concrete.

This Standard also applies to the products compounded with steel slag powder, ground granulated blast furnace slag, and coal fly ash.

2 Normative references

The provisions in the following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest versions apply to this Standard.

GB/T 176 *Methods for chemical analysis of cement* (GB/T 176-1996, eqv ISO 680:1990)

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 1346-2001, eqv ISO 9597:1989)

GB/T 2419 *Test method for fluidity of cement mortar*

GB/T 5483 *Gypsum and anhydrite* (GB/T 5483-1996, eqv ISO 1587:1975)

GB/T 8074-1987 *Testing method for specific surface of cement – Blaine method*

GB 8076-1997 *Concrete admixture*

GB/T 8170 *Rules of rounding off for numerical values*

GB 9774 *Sacks for packing cement*

GB 12573 *Sampling method for cement*

GB/T 17671 *Method of testing cements – Determination of strength* (GB/T 17671-1999, idt ISO 679:1989)

GB/T 18046-2000 *Ground granulated blast furnace slag used for cement and concrete*

YB/T 022 *Steel slag used for cement*

YB/T 140 *Method for chemical analysis of steel slag in cement*

JC/T 667 *Admixture for cement grinding process*

3 Terms and definitions

3.1 Steel slag powder

It refers to the product made by grinding the converting or electric furnace steel slag (hereinafter referred to as “steel slag”) conforming to the provisions specified in the YB/T 022 to a certain degree of fineness after iron removal by magnetic separation.

When grinding, it is allowable to add appropriate amount of gypsum conforming to the GB/T 5483, and admixture for cement grinding process conforming to the JC/T 667.

3.2 Basic parameter

The basic parameter of steel slag refers to the ratio OF basic oxide TO acidic oxide in the chemical composition.

CALCULATE the basic parameter according to the Formula (1) [DETERMINE the values of w (CaO), w (SiO_2) and w (P_2O_5) according to the provisions specified in the YB/T 140]:

$$\text{Basic parameter} = \frac{w(\text{CaO})}{w(\text{SiO}_2) + w(\text{P}_2\text{O}_5)} \quad \cdots\cdots(1)$$

Where,

w (CaO) – Calcium oxide, mass fraction, %;

c) When there are major differences between the exit-factory inspection results and the last type inspection results;

d) When the national quality supervision organizations make a request for type inspection.

6.3 Acceptance rules

6.3.1 Determination rules

If the performance of the steel slag powder conforms to the provisions of appropriate grades specified in Table 1, the steel slag powder will be determined to the appropriate grade. If one of the items fails to conform to the specified index, the steel slag powder will be degraded or determined to be non-conforming product.

6.3.2 Re-acceptance

Within the product storage period, when the user raises an objection to the product quality, it is allowable to conduct re-acceptance. The sealed samples with the same serial number can be used for re-acceptance. If the user makes a request for field sampling, it shall be pre-specified in the supply contract.

7 Quality inspection report

According to the user needs, the manufacturing plant shall send the quality inspection report within 11 days from the date of delivering the steel slag powder. Furthermore, the supplementary declaration of 28d activity index shall be made within 32 days from the date of delivering the steel slag powder.

8 Packaging, marks, transportation and storage

8.1 Packaging

The steel slag powder can be packed in bags or in bulk. If packed in bags, the net mass of each bag shall not be less than 98% of the marked mass. DRAW 20 bags at random. The total mass shall not be less than 20 times the marked mass.

The packaging bags shall conform to the provisions specified in the GB 9774. The bulk shall be agreed by supply and requisitioning parties.

8.2 Marks

Appendix A

(Informative)

Determination of the steel slag powder's activity index and fluidity ratio

A.1 Scope

This Appendix specifies the test methods for the activity index and fluidity ratio of the steel slag powder.

A.2 Test instruments

USE the test instruments specified in the GB/T 17671 *Method of testing cements – Determination of strength*.

A.3 Test materials

A.3.1 Reference sample – cement

USE the reference cement specified in the Appendix C of the GB 8076-1997. It is also allowable to use Type I portland cement whose strength grade is not less than 42.5MPa, which is prepared by grinding dihydrate gypsum along with the cement clinker whose content (mass fraction) of tricalcium aluminate (C_3A) is within the range of 6% to 8%, and total alkali content (%) [$w(Na_2O) + 0.658w(K_2O)$] is not greater than 1%.

A.3.2 Sand

USE the standard sand conforming to the provisions specified in the GB/T 17671.

A.3.3 Water

USE tap water or distilled water.

A.3.4 Test steel slag powder sample

It refers to the mixture of reference sample and steel slag powder according to the mass ratio of 7:3.

A.3.5 Reference mortar

It refers to the mortar prepared according to the method described in the GB/T 17671, by using reference sample.

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