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By-Product Gypsum Used in Cement

用于水泥中的工业副产石膏

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By-Product Gypsum Used in Cement

1 Scope

This Standard specifies the terms and definitions, technical requirements, test methods and judgment rules, transportation and storage of industrial by-product gypsum used in cement.

This Standard is applicable to the acceptance and use of industrial by-product gypsum for adjusting the setting time of cement.

2 Normative References

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

GB/T 1346 Standard Test Method for Water Requirement for Normal Consistency Setting Time and Soundness of the Portland Cement

GB/T 2419 Test Method for Fluidity of Cement Mortar

GB/T 5483 Natural Gypsum

GB/T 5484 Methods for Chemical Analysis of Gypsum

GB 6566 Limit for Radionuclides in Building Materials

GB/T 17671 Test Method of Cement Mortar Strength (ISO Method)

JC/T 1083 Test Method for Compatibility of Cement and Water-Reducing Agent

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 By-product gypsum

The general term for by-products with calcium sulfate as the main component that are discharged from industrial manufacturing.

NOTE 1: Also known as chemical gypsum, synthetic gypsum.

S – mass fraction of SO_3 , expressed by percentage (%);

w – mass fraction of crystal water, expressed by percentage (%).

5.3 Radioactive material limits

It shall be tested according to GB 6566.

5.4 Influence of industrial by-product gypsum on cement properties

5.4.1 Preparation of contrast cement

It is the P·I Portland cement, which is prepared by the Category-G and Class-2 above (including Class-2) gypsum specified in GB/T 5483, with SO_3 content of 2.0%~2.5%, 80 μm sieve residue of less than 4%, and specific surface area of 350 $\text{m}^2/\text{kg} \pm 10\text{m}^2/\text{kg}$.

5.4.2 Preparation of test cement

It is P·I Portland cement that is prepared by using Portland cement clinker for preparing contrast cement and by replacing natural gypsum with 30%~100% of the assessed industrial by-product gypsum. During the preparation, the 80 μm sieve residue of the cement shall be controlled to less than 4%, the specific surface area shall be within the range of 350 $\text{m}^2/\text{kg} \pm 10\text{m}^2/\text{kg}$, and the difference between the SO_3 content and the contrast cement SO_3 content shall be within 0.2%.

5.4.3 Standard consistency water consumption, setting time and stability of cement

It shall be tested according to GB/T 1346.

5.4.4 Fluidity of cement mortar

The preparation of cement mortar is carried out according to GB/T 17671; and the fluidity test operation of cement mortar is carried out according to GB/T 2419.

5.4.5 Strength of cement mortar

It shall be tested according to GB/T 17671.

5.4.6 Compatibility of cement and water-reducing agent

It shall be tested according to JC/T 1083.

6 Judgment Rules

When any one of 4.1, 4.3, 4.4, 4.5 and 4.6 does not meet the requirements of this Standard, it cannot be used in the manufacturing of cement.

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