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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 2015-2017

Replacing GB/T 2015-2005

White Portland cement

白色硅酸盐水泥

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1 Scope

China's national product standard for white Portland cement. It specifies the terms and definitions, the composition and materials, the grading and codes, the technical requirements, the test methods, the inspection rules, and the packaging, marking, transport and storage, with a normative annex giving the method for determining whiteness, and it applies to the production and use of white Portland cement. White cement is ordinary Portland cement with the colour removed, and removing the colour is the whole difficulty. Grey cement is grey because of iron: the iron oxide in the raw materials forms the ferrite phase, which is dark and which also acts as a flux that lowers the burning temperature in the kiln. Making the clinker white therefore means finding limestone and clay almost free of iron and manganese, avoiding contamination from the grinding media and the kiln lining, and burning at a higher temperature without the flux the iron used to provide - after which the clinker is usually quenched in water to prevent reoxidation. All of that makes white cement several times the price of grey, and it is bought for exactly one property that grey cement cannot provide: colour. Architectural concrete, terrazzo, tile adhesive, cast stone, and every pigmented mortar and coloured concrete, since a pigment added to grey cement produces a muddy version of itself. So the standard grades the product by whiteness, with its own normative test method, and requires everything a structural cement must also deliver: the strength grades and their development, the setting time, the soundness, the fineness, and the limits on the chemical constituents. Issued on 14 October 2017 and in force since 1 September 2018, it replaces GB/T 2015-2005.

This Standard specifies the terms, definitions, components, materials, grading, code, technical requirements, test methods, inspection rules, packaging, mark, transportation and storage of white Portland cement. This Standard is applicable to the production and application of white Portland cement.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is also applicable to this Standard.

GB/T 176 Method for Chemical Analysis of Cement

GB/T 1345 The Test Sieving Method for Fineness of Cement

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

GB/T 5483-2008 Natural Gypsum

GB/T 5950-2008 Method for Measurement of Whiteness of Building Materials and Non-metal Mineral Products

GB/T 6566 Limit for Radionuclides in Building Materials

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 17749-2008 Methods of Whiteness Specification

GB/T 21371 By-product Gypsum Used in Cement

GB/T 26748 Cement Grinding Aids

GB 31893 Limit and Determination of the Water-soluble Chromium (VI) Content for Cement

5 Grading and Code

5.1 White Portland cement shall be divided into Grade-32.5, Grade-

52.5 in accordance with the strength.

5.2 White Portland cement shall be divided into Grade-1 and Grade-2 in accordance with the whiteness; its code shall be PW-1 and PW-2 respectively.

6.1 Chemical Composition

6.1.1 Sulphur trioxide Sulphur trioxide shall not exceed 3.5%.

6.1.2 Water-soluble hexavalent chromium (VI) in cement Water-soluble hexavalent chromium in cement shall not exceed 10 mg/kg.

6.1.3 Chloride ion (selective indicator) Chloride ion shall not exceed 0.06%.

6.1.4 Alkali content (selective indicator) Alkali content in cement shall be expressed in the calculation of $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$. If active aggregate is adopted and users demand the supply of low-alkali cement, alkali content in cement shall be not more than 0.60%, or it shall be negotiated and determined by the buyer and the seller.

6.2 Physical Properties

6.2.1 Fineness The residue on 45 μm square-hole sieve shall be not more than 30.0%.

6.2.2 Soundness of boiling method The soundness of boiling method shall be qualified.

6.2.3 Setting time The initial setting time shall be no less than 45 min; the ultimate setting time shall be no more than 600 min.

6.2.4 Whiteness Whiteness shall be tested in accordance with the stipulations in GB/T 5950-2008. Standard whiteboard, instruments and instrument calibration, sample storage and preparation, result calculation and treatment shall comply with Appendix A.

7.6 Strength Strength shall be tested in accordance with the stipulations in GB/T 17671.

7.7 Radioactivity Radioactivity shall be tested in accordance with the stipulations in GB 6566.

8 Inspection Rules

8.1 Serial Number and Sampling Before exit factory, cement shall be numbered and sampled in accordance with the same grade of whiteness and strength. Bagged cement and bulk cement shall be respectively numbered and sampled. The serial number of cement shall comply with the following stipulations of the annual output of cement factory.

---Cement factory with over 600,000 t of annual output. a serial number shall be constituted of less than 800 t;

---Cement factory with 100,000 t ~ 600,000 t of annual output. a serial number shall be constituted of less than 500 t;

---Cement factory with less than 100,000 t of annual output. a serial number shall be constituted of less than 200 t. Cement shall be sampled in accordance with the stipulations in GB/T 12573. Manual or automatic sampling can be adopted; the total weight shall be at

least 12 kg. When the capacity of tools transporting bulk cement exceeds the exit-factory number tonnage stipulated by the enterprise, the tonnage of the number can be allowed to exceed the tonnage stipulated by sampling.

8.2 Cement Exit-factory When it is confirmed that cement complies with the various technical requirements and the requirements for packaging quality, it can be allowed to exit factory.

8.3 Cement Inspection

8.3.1 Exit-factory inspection Exit-factory inspection items are the content stipulated in 6.1.1, 6.2.1, 6.2.2, 6.2.3,

6.2.4 and 6.2.5. inspection result of the sampling of material object; or the test report of the same serial number of cement released by cement factory. The buyer and the seller shall negotiate and determine which method of acceptance check shall be adopted; this content shall be indicated in the contract or agreement.

8.6.2 When the inspection result of the sampling of material object is taken as the basis, the buyer and the seller shall also take a sample and seal the package before delivery or on the site of delivery. The sampling method shall comply with GB/T 12573; the sampling size is 24 kg, which shall be divided into two equal parts. One part shall be preserved by the seller for 40 days; the other part shall be inspected by the buyer in accordance with the items and methods stipulated in this Standard. Within 40 days, when the buyer believes that the product quality cannot comply with the requirements in this Standard after inspection and the seller believes it is controversial, both parties shall submit the other sample preserved by the seller to a provincial-level or above cement quality supervision and inspection institution that is nationally acknowledged for arbitration and inspection.

8.6.3 When the test report of the same serial number of cement released by cement factory is taken as the basis of acceptance check, the buyer shall take a sample from the same serial number of cement before shipment or during delivery. After both parties seal the package, it shall be preserved by the seller for 90 days, or acknowledge the preserved sample independently taken, sealed and preserved for 90 days by the seller. Within 90 days, when the buyer has doubts about the cement quality, both parties shall submit the jointly sealed sample to a provincial-level or above cement quality supervision and inspection institution that is nationally acknowledged for arbitration and inspection.

9 Packaging, Mark, Transportation and Storage

9.1 Packaging Cement can be in bags or bulk. The net weight of each bag of cement shall be 50 kg and no less than 99% of the marked weight. In a random sampling of 20 bags, the weight (including the packaging bag) shall be no less than 1,000 kg. Other forms of packaging shall be negotiated and determined by both parties. However, relevant