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

GB/T 748-2023

Sulfate resistance portland cement

抗硫酸盐硅酸盐水泥

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Foreword

This document was issued on 23 May 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 December 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 748-2023 covers sulfate resistance portland cement in its moderate and high resistance grades - cement ground from clinker whose mineral balance is controlled so that concrete standing in sulfate bearing ground or water does not expand and break itself apart. The materials clause starts at the clinker, which is mainly calcium silicate, and runs through the other constituents; the strength grade is 42.5 for both grades; and the technical requirements cover chemical composition, with magnesium oxide held to not more than 5.0 % by mass, alongside the physical properties. Clause 7 assigns each requirement to an existing test method, and Appendix A, which is normative, gives the calculation by which the mineral composition of the cement is derived from the oxide analysis. Inspection rules, delivery and acceptance - including whether acceptance rests on a physical sample or on the manufacturer's report for the same lot number - and packaging, marking, transportation and storage complete the document. Sulfate attack surfaces years after casting, when

repair means demolition, so the choice of this cement is made at mix design. For cement producers, ready mix suppliers, and designers of foundations, tunnels and works in saline soil.

This document specifies the materials, strength grades, technical requirements, test methods, inspection rules, packaging, marking, transportation, and storage of sulfate-resistant portland cement.

This document applies to the production and application of sulfate-resistant portland cement.

2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 176 Methods for chemical analysis of cement

GB/T 749 Test method for determining capability of resisting sulfate corrode of cement

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 5483 Natural gypsum

GB 6566 Limits of radionuclides in building materials

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

GB/T 9774 Sacks for packing cement

GB/T 12573 Sampling method for cement

GB/T 17671 Test method of cement mortar strength (ISO method)

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

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 moderate sulfate resistance portland cement

A hydraulic material that is made from portland cement clinker with appropriate composition, which is added with an appropriate amount of gypsum and then ground, and can resist the erosion of medium mass concentration sulfate ions (≤ 2500 mg/L).

NOTE: Moderate sulfate resistance portland cement is referred to as moderate sulfate resistance cement,

and the code name is P.MSR.

3.2 high sulfate resistance portland cement

A hydraulic material that is made from portland cement clinker with appropriate composition, which is added with an appropriate amount of gypsum and then ground, and can resist the erosion of higher mass concentration sulfate ions (> 2500 mg/L and ≤ 8000 mg/L).

NOTE: High sulfate resistance portland cement is referred to as high sulfate resistance cement, and the

code name is P.HSR.

4 Materials

4.1 Clinker

The portland cement clinker, which is composed of appropriate ingredients, mainly includes calcium silicate, and is obtained from burning the raw meal composed of appropriate ingredients until it is partially melted.

4.2 Gypsum

4.2.1 Natural gypsum

It shall comply with the provisions of GB/T 5483.

4.2.2 Desulfurization gypsum

It shall comply with the provisions of GB/T 21371.

4.3 Cement grinding aids

Grinding aids are allowed to be added during cement grinding, and the amount added shall not exceed 0.5% of the cement mass. Grinding aids shall comply with the provisions of GB/T 26748.

5 Strength grade

The strength grade of moderate and high sulfate resistance cement is 42.5.

6 Technical requirements

6.1 Requirements for chemical composition

6.1.1 Magnesium oxide (MgO)

The content (mass fraction) of magnesium oxide is not more than 5.0%.

If the cement passes the autoclave method for soundness, the content (mass fraction) of magnesium oxide in the cement does not exceed 6.0%.

6.1.2 Sulfur trioxide (SO₃)

The content (mass fraction) of sulfur trioxide is not more than 2.5%.

6.1.3 Loss on ignition (LOI)

The loss on ignition (mass fraction) is not more than 3.0%.

6.1.4 Insoluble residue (IR)

The content (mass fraction) of insoluble residue is not more than 0.75%.

6.2 Water-soluble chromium (VI) in cement

Water-soluble chromium (VI) in cement shall meet the requirements of GB 31893.

6.3 Tricalcium silicate (C₃S) and tricalcium aluminate (C₃A)

The content of tricalcium silicate and tricalcium aluminate in cement shall meet the requirements in Table 1.

6.6 Radioactivity

The specific activity of radioactivity shall meet the requirement that the internal exposure index I_{Ra} is not greater than 1.0 and the external exposure index I_r is not greater than 1.0.