

SINGAPORE STANDARD

## **Specification for cement**

– Part 4 : Composition, specifications and conformity criteria for low early strength blastfurnace cements

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## **National Foreword**

This Singapore Standard was prepared by the Technical Committee on Building Structure and Sub-structure under the purview of the Building and Construction Standards Committee.

This standard is the result of the review of the following Singapore Standards:

SS 26 : 2000 – Specification for ordinary Portland cement

SS 476 : 2000 – Specification for high slag blastfurnace cement

SS 477 : 2000 – Specification for Portland blastfurnace cements

This standard is a part of the series SS EN 197 'Cement' which comprises the following additional parts:

- Part 1 Composition, specifications and conformity criteria for common cements
- Part 2 Conformity evaluation

The standard is identical to EN 197-4 : 2000 'Cement – Part 4 : Composition, specifications and conformity criteria for low early strength blastfurnace cements' and adopted with permission of CEN, Rue de Stassart 36, B-1050 Brussels.

Attention is drawn to the following:

1. Where reference is made to European Standards, it has been replaced by 'Singapore Standard' where applicable.
2. The comma used as a decimal marker has been replaced by a full point on the baseline.
3. The National Foreword replaces the Foreword of EN 197-1.

The requirements in SS EN 197-4 are based on the results of tests on cement in accordance with EN 196 Parts 1, 2, 3, 7, 8 and 9. The temperature used in the test method specifications is only for conformity testing requirements and may not represent the temperature when the material is used in concrete. The guidelines for testing temperature and humidity to be adopted for Singapore are given in Annex ZZA of this standard.

The detailed requirements for evaluating the conformity of common cements with this standard, including certification of conformity by a third party, are given in SS EN 197-2 : 2008 'Cement – Part 2 : Conformity evaluation' with following guidelines:

- 'Recommended sampling plan for imported cement' (Annex ZZA in SS EN 197-2). Since most cements are imported into Singapore where the manufacturer may not have production control as set out in EN 197-2, this alternate approach is intended to ensure that quality of cement imported for use in Singapore will have equivalent assurance of quality compared to cement that may be manufactured within Singapore.

The strength attained at 28 days is the important criterion in classifying cement for most uses. In order to achieve a specific strength class at 28 days the early strength, at 2 days or at 7 days, can vary and some types of cement may not attain the minimum early strengths specified in SS EN 197-1 for common cements. The heat of hydration is linked to the early reactivity and lower early strengths indicate lower heat evolution and lower temperatures in concrete. For these cements additional precautions in use can be necessary to ensure adequate curing and safety in construction. The purpose of this SS EN 197-4 is to specify the composition requirements and conformity requirements for low early strength blastfurnace cements and low early strength blastfurnace cements with low heat of hydration.

At the time of publication, this standard is expected to be used as a reference in the Building and Construction Authority's 'Approved Document – Acceptable Solutions'.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. SPRING Singapore shall not be held responsible for identifying any or all of such patent rights.

**NOTE**

1. *Singapore Standards are subject to periodic review to keep abreast of technological changes and new technical developments. The changes in Singapore Standards are documented through the issue of either amendments or revisions.*
2. *Compliance with a Singapore Standard does not exempt users from legal obligations.*



# Specification for cement – Part 4 : Composition, specifications and conformity criteria for low early strength blastfurnace cements

## Introduction

It is recognised that different cements have different properties and performance. Those performance tests now available (i.e. setting time, strength, soundness and heat of hydration), have been included in this SS EN 197-4. In addition, work is being carried out by CEN/TC 51 to identify any additional tests which are needed to specify further performance characteristics of cement. Until further performance tests are available it is highly recommended that the choice of cement, especially the type and/or strength class in relation to the requirements for durability depending on exposure class and type of construction in which it is incorporated, follows the appropriate standards and/or regulations for concrete valid in the place of use.

## 1 Scope

This SS EN 197-4 defines and gives the specifications of 3 distinct low early strength blastfurnace cement products and their constituents. The definition of each cement includes the proportions in which the constituents are to be combined to produce these distinct products in a range of three strength classes. The definition also includes requirements the constituents have to meet and the mechanical, physical, chemical, including where appropriate, heat of hydration, requirements and strength classes. This SS EN 197-4 also states the conformity criteria and the related rules. Necessary durability requirements are also given.

NOTE 1 – In addition to the specified requirements, an exchange of additional information between the cement producer and user can be helpful. The procedures for such an exchange are not within the scope of SS EN 197-4 but should be dealt with in accordance with national standards or regulations or can be agreed between the parties concerned.

NOTE 2 – The word "cement" in this SS EN 197-4 is used to refer only to low early strength blastfurnace cements unless otherwise indicated.

## 2 Normative references

This Singapore Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Singapore Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 196-1	Methods of testing cement – Part 1 : Determination of strength
EN 196-2	Methods of testing cement – Part 2 : Chemical analysis of cement
EN 196-3	Methods of testing cement – Part 3 : Determination of setting time and soundness
EN 196-7	Methods of testing cement – Part 7 : Methods of taking and preparing samples of cement
EN 196-8	Methods of testing cement – Part 8 : Determination of heat of hydration – Solution method