

**SS 544 : Part 2 : 2019**  
**BS 8500-2:2015+A1:2016, IDT**  
(ICS 91.100.30)

**SINGAPORE STANDARD**

# **Concrete – Complementary Singapore Standard to SS EN 206**

– Part 2 : Specification for constituent materials and  
concrete

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## **National Foreword**

This Singapore Standard was prepared by the Technical Committee on Building Structures and Substructures under the purview of BCSC.

This standard is a revision of SS 544-2:2009. It is an identical adoption of BS 8500-2:2015+A1:2016 Complementary British Standard to BS EN 206-1, Part 2: Specification for constituent materials and concrete' and is implemented with the permission of the British Standards Limited.

SS 544 – 'Concrete – Complementary Singapore Standard to SS EN 206' comprises two parts:

- Part 1: Method of specifying and guidance for the specifier;
- Part 2: Specification for constituent materials and concrete.

This revision introduced the following principal changes:

- Changes necessary to align with the publication of SS EN 206:2014;
- Changes resulting from new or revised EN standards published since 2006;
- Alignment with conformity assessment and accreditation policy on Singapore;
- Introduction of designated cement-bound concrete;
- Modification of requirements for concrete to resist freezing and thawing;
- Corrections and minor clarifications;
- A new annex (Annex D) has been added which sets out where to find the SS 544 provisions that cover SS EN 206 requirements that defer to provisions in the place of use; and
- All references have been updated.

SS 544 contains additional Singapore provisions to be used in conjunction with SS EN 206. Together they form a complete package for the specification, production and conformity of fresh concrete.

Singapore guidelines are provided in informative Annexes ZA to ZD. They concern circumstances which are typical for Singapore such as climatic conditions (testing temperatures) for concrete, aggregates, cement and admixture.

The following guidelines are to guide local users:

1. Introduction – Exposure classes related to environmental conditions

For the tropical climate in Singapore, it is recommended that the provision for resisting the same exposure conditions be raised by at least one class higher than the corresponding level for use in UK (see SS 544-1, Local guidelines are highlighted for the adoption of BS 8500-1: Annex A (informative) 'Guidance for the specifier'.

2. Clause 5.4 Concrete temperature

The temperature of fresh concrete at the time of delivery should not exceed 38°C unless specified.



3. Clause 7 Designed concrete

- Strength development should be based on curing temperature of  $(27 \pm 2) ^\circ\text{C}$
- Constituent materials and cubes are stored at  $(27 \pm 5) ^\circ\text{C}$  and  $(27 \pm 2) ^\circ\text{C}$  respectively.

4. Clause 6 Designated concrete and Clause 9 Standardised prescribed concrete

Designated concrete and standardised prescribed concrete are derived based on UK experience and materials. Local users are advised to make appropriate judgment on the relevance / suitability of their use in the specific environmental condition (see Introduction).

5. Clause 12.2 Conformity control for compressive strength

Local guidelines are highlighted in SS 544-1 and the conformity criteria for 100 mm cubes and 150 mm cubes as provided for in SS 544-2 is adopted.

6. Although performance based testing has been introduced in standards for testing materials, they follow prescribed testing procedures and environmental conditions hence test results may or may not be directly related to actual applications on site.

It has been assumed in the preparation of this Singapore Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

**NOTE**

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "Mature Standards". Mature Standards will not be subject to further review, unless there are requests to review such standards.*
2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*
3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

# Concrete – Complementary Singapore Standard to SS EN 206 – Part 2 : Specification for constituent materials and concrete

## 0 Introduction

The requirements in this part of SS 544 are given for defined materials with an established or accepted adequate performance in Singapore conditions. These requirements might not be appropriate for use in exposure conditions different from Singapore. The use of constituents not listed in this standard should be by agreement between the producer and specifier on a case-by-case basis. Some guidance on the performance of these materials can be obtained by relative performance testing, as discussed in Concrete Society publication CS 109 [1].

SS 544 and SS EN 206 take account of the distinct and different technical responsibilities of the specifier, producer and user. Where a body is responsible for more than one of these roles, internal procedures within that body should allocate responsibilities for the various actions.

NOTE - See National Foreword for additional Singapore provisions.

## 1 Scope

This part of SS 544 specifies constituent materials and concrete. This part of SS 544 complements SS EN 206. It provides Singapore national provisions where required or permitted by SS EN 206. It also covers materials, methods of testing and procedures that are outside the scope of SS EN 206, but within national experience.

## 2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### Standards publications

BS 812-104:1994	<i>Testing aggregates – Part 104 : Method for qualitative and quantitative petrographic examination of aggregates</i>
BS 812-123	<i>Testing aggregates – Part 123 : Method for determination of alkali-silica reactivity – Concrete prism method</i>
BS 1704	<i>Specification for solid-stem general purpose thermometers</i>
BS 1881-124	<i>Testing concrete – Part 124 : Method for analysis of hardened concrete</i>
BS 1881-129	<i>Testing concrete – Part 129 : Method for determination of density of partially compacted semi-dry fresh concrete</i>
BS 6068-2.37	<i>Water quality – Part 2 : Physical, chemical and biochemical methods – Section 2.37: Method for the determination of chloride via a silver nitrate titration with chromate indicator (Mohr's method)</i>
BS 6068-2.42	<i>Water quality – Part 2: Physical, chemical and biochemical methods – Section 2.42: Determination of sodium and potassium: determination of sodium by atomic absorption spectrometry</i>