

**NA to SS EN 1992-4:2021**  
**NA to BS EN 1992-4:2018, MOD**  
(ICS 91.010.30; 91.080.40)

**SINGAPORE STANDARD**

**Singapore National Annex to Eurocode 2 –  
Design of concrete structures**

– Part 4 : Design of fastenings for use in concrete

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## National Foreword

This National Annex was prepared by the Working Group on Design of Concrete Structures – Part 4: Design of Fastenings for Use in Concrete, set up by the Technical Committee on Building Structures and Substructures under the purview of Building and Construction Standards Committee.

This standard is a modified adoption of the UK National Annex (NA) to BS EN 1992-4:2018, 'Eurocode 2 – Design of concrete structures – Part 4: Design of fastenings for use in concrete' and is implemented with the permission of the British Standards Limited.

This Singapore NA contains information on those parameters which are left open in EN 1992-4 for national choice, known as nationally determined parameters. The Singapore NA is to be read in conjunction with the SS EN 1992-4:2021 – Eurocode 2 – Design of concrete structures – Part 4: Design of fastenings for use in concrete.

In this standard, certain modifications due to national requirements and the particular needs of the local industry have been made. These technical deviations and additional information have been added directly to the clauses to which they refer, and are marked by a margin on the left of the standard. A complete list of modifications is given as follows:

- The importance class in Table C.1 has been changed to “Ordinary” and “Special” [clause C.2(2)]
- The upper limit for the value of  $a_{g,S}$  for “Very Low” seismicity level has been changed to 0.04g [clause C.2(2) Table C.1]
- The lower limit for the value of  $a_{g,S}$  for “Low” seismicity level has been changed to 0.04g [clause C.2(2) Table C.1]
- Clause C.4.4(3) is removed as it is not applicable in Singapore

In Singapore, in the absence of a qualified installer certification scheme, proof load testing of post-installed anchors is carried out. Users may refer to the guidance in BS 8539:2012 - Code of practice for the selection and installation of post-installed anchors in concrete and masonry and the following recommendations to meet the needs of the local industry:

- Proof load test frequency is defined in the tender documentation. However, in the absence of such, then the following test frequency (round up to the next integer) is used:

No. of fasteners, n, to be installed #	Test frequency
0 - 1000	$n \times 2.5\%$ or 3 (whichever is greater)
1001 - 5000	$25 + (n-1000) \times 1.0\%$
5001 and above	$65 + (n-5000) \times 0.2\%$

# n is the number of fastener points to be installed in any discrete area as defined in BS 8539, Annex B.3.

- Proof load value is taken as 1.5 x Characteristic Action.
- Special cases, such as fall arrest system, will require a different regime. All other aspects of BS 8539 are followed.

NOTE – References to Overseas Standards are replaced by applicable Singapore Standards.

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.*

## Singapore National Annex (informative) to SS EN 1992-4, Eurocode 2: Design of concrete structures — Part 4: Design of fastenings for use in concrete

### NA.1 Scope

This National Annex gives:

- a) the Singapore decisions for the Nationally Determined Parameters described in the following subclauses of SS EN 1992-4:2021 (see **NA.2**):
  - 4.4.1(2)
  - 4.4.2.2(2)
  - 4.4.2.3
  - 4.4.2.4
  - 4.7(2)
  - C.2(2)
  - C.4.4(1)
  - C.4.4(3)
  - D.2(2)
- b) the Singapore decisions on the status of SS EN 1992-4:2021 informative annexes (see **NA.3**); and
- c) references to non-contradictory complementary information (see **NA.4**).