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EN 1993-1-6:2007, IDT
(ICS 91.010.30; 91.080.10)

SINGAPORE STANDARD

Eurocode 3 : Design of steel structures

– Part 1-6 : Strength and stability of shell structures

This national standard is the identical implementation of EN 1993-1-6 : 2007 and is adopted with permission of CEN, Rue de la Science 23 B - 1040 Brussels

Incorporating Amendment No. 1

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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 SS EN is the identical implementation of EN 1993-1-6 : 2007 'Eurocode 3 : Design of steel structures – Part 1-6 : Strength and stability of shell structures' . and is adopted with permission of CEN, Rue de la Science 23 B - 1040 Brussels. It includes Corrigendum EN 1993-1-6:2007/AC:2009, denoted by AC1> <AC1 and Amendment EN 1993-1-6:2007/A1:2017, denoted by A1> <A1.

Attention is drawn to the following:

- The comma has been used throughout as a decimal marker whereas in Singapore Standards, it is a practice to use a full point on the baseline as the decimal marker.
- The Singapore Standards which implement international or European publications referred to in this document may be found in the SS Electronic Catalogue at: <https://www.singaporestandardseshop.sg>

Where a normative part of the EN allows for national choice to be made, the range and possible choice will be given in the normative text as Recommended Values, and a note will qualify it as a Nationally Determined Parameter (NDP). NDPs can be a specific value for a factor, a specific level or class, a particular method or a particular application rule if several are proposed in the EN.

Singapore National Annex to SS EN 1993-1-6

To enable EN 1993-1-6 to be used in Singapore, the TC has decided that no National Annex will be issued and recommend the following:

- All the Recommended Values should be used;
- All Informative Annexes may be used; and
- No NCCI have currently been identified.

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.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1993-1-6:2007+A1

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Incorporating corrigendum April 2009

English Version

Eurocode 3 - Design of steel structures - Part 1-6: Strength and Stability of Shell Structures

Eurocode 3 - Calcul des structures en acier - Partie 1-6:
Résistance et stabilité des structures en coque

Eurocode 3 - Bemessung und Konstruktion von
Stahlbauten - Teil 1-6: Festigkeit und Stabilität von Schalen

This European Standard was approved by CEN on 12 June 2006.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 1993-1-6: 2007+A1:2017 (E)

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Foreword

This European Standard EN 1993-1-6, Eurocode 3: Design of steel structures: Part 1-6 Strength and stability of shell structures, has been prepared by Technical Committee CEN/TC250 «Structural Eurocodes», the Secretariat of which is held by BSI. CEN/TC250 is responsible for all Structural Eurocodes.

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by August 2007, and conflicting National Standards shall be withdrawn at latest by March 2010.

This Eurocode supersedes ENV 1993-1-6.

According to the CEN-CENELEC Internal Regulations, the National Standard Organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 1993-1-6: 2007+A1:2017 (E)**Foreword to amendment A1**

This document (EN 1993-1-6:2007/A1:2017) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2018, and conflicting national standards shall be withdrawn at the latest by April 2018.

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National annex for EN 1993-1-6

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. Therefore the National Standard implementing EN 1993-1-6 should have a National Annex containing all Nationally Determined Parameters to be used for the design of steel structures to be constructed in the relevant country.

National choice is allowed in EN 1993-1-6 through:

- 3.1.(4)
- 4.1.4 (3)
- 5.2.4 (1)
- **A1** 6.2.1 (6) **A1**
- 6.3 (5)
- 7.3.1 (1)
- 7.3.2 (1)
- 8.4.2 (3)
- 8.4.3 (2)
- 8.4.3 (4)
- 8.4.4 (4)
- 8.4.5 (1)
- 8.5.2 (2)
- 8.5.2 (4)
- **A1** 8.6.3 (5) **A1**
- 8.8.2 (9)
- 8.8.2 (18)
- 8.8.2 (20) (2 times)
- 9.2.1 (2)P

1. General

1.1 Scope

- (1) EN 1993-1-6 gives basic design rules for plated steel structures that have the form of a shell of revolution.
- (2) This Standard is intended for use in conjunction with EN 1993-1-1, EN 1993-1-3, EN 1993-1-4, EN 1993-1-9 and the relevant application parts of EN 1993, which include:
 - Part 3.1 for towers and masts;
 - Part 3.2 for chimneys;
 - Part 4.1 for silos;
 - Part 4.2 for tanks;
 - Part 4.3 for pipelines.
- (3) This Standard defines the characteristic and design values of the resistance of the structure.
- (4) This Standard is concerned with the requirements for design against the ultimate limit states of:
 - plastic limit;
 - cyclic plasticity;
 - buckling;
 - fatigue.
- (5) Overall equilibrium of the structure (sliding, uplifting, overturning) is not included in this Standard, but is treated in EN 1993-1-1. Special considerations for specific applications are included in the relevant application parts of EN 1993.
- (6) The provisions in this Standard apply to axisymmetric shells and associated circular or annular plates and to beam section rings and stringer stiffeners where they form part of the complete structure. General procedures for computer calculations of all shell forms are covered. Detailed expressions for the hand calculation of unstiffened cylinders and cones are given in the Annexes.
- (7) Cylindrical and conical panels are not explicitly covered by this Standard. However, the provisions can be applicable if the appropriate boundary conditions are duly taken into account.
- (8) This Standard is intended for application to steel shell structures. Where no standard exists for shell structures made of other metals, the provisions of this standards may be applied provided that the appropriate material properties are duly taken into account.
- (9) The provisions of this Standard are intended to be applied within the temperature range defined in the relevant EN 1993 application parts. The maximum temperature is restricted so that the influence of creep can be neglected if high temperature creep effects are not covered by the relevant application part.
- (10) The provisions in this Standard apply to structures that satisfy the brittle fracture provisions given in EN 1993-1-10.
- (11) The provisions of this Standard apply to structural design under actions that can be treated as quasi-static in nature.
- (12) In this Standard, it is assumed that both wind loading and bulk solids flow can, in general, be treated as quasi-static actions.
- (13) Dynamic effects should be taken into account according to the relevant application part of EN 1993, including the consequences for fatigue. However, the stress resultants arising from dynamic behaviour are treated in this part as quasi-static.
- (14) The provisions in this Standard apply to structures that are constructed in accordance with EN 1090-2.
- (15) This Standard does not cover the aspects of leakage.