Warnvermerk / Warning notice	DIN EN 1993-1-6:2017-07	
Datum / Date	2020-01-21	
Es wurde festgestellt, dass die aufgrund der europäischen Änderung EN 1993-1-6/A1:2017 in DIN EN 1993-1-6:2017-07 veröffentlichten Gleichungen (D.14c) und (D.14d) ggf. zu unsicheren Ergebnissen führen können.		
Es wird bereits an einer Behebung dieser Situation gearbeitet.		
It was recognized that the equations (D.14c) und (D.14d) from EN 1993-1-6/A1:2017 published in DIN EN 1993-1-6:2017-07 may lead to unsafe results.		
Effort have already been taken to solve this	s situation	
	2020-01 / 29833	

- Leerseite -

DIN EN 1993-1-6



ICS 91.010.30; 91.080.13

Supersedes DIN EN 1993-1-6:2010-12

Eurocode 3 – Design of steel structures – Part 1-6: Strength and Stability of Shell Structures; English version EN 1993-1-6:2007 + AC:2009 + A1:2017, English translation of DIN EN 1993-1-6:2017-07

Eurocode 3 – Bemessung und Konstruktion von Stahlbauten – Teil 1-6: Festigkeit und Stabilität von Schalen; Englische Fassung EN 1993-1-6:2007 + AC:2009 + A1:2017, Englische Übersetzung von DIN EN 1993-1-6:2017-07

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A comma is used as the decimal marker.

National foreword

This document (EN 1993-1-6:2007 + AC:2009 + A1:2017) has been prepared by Technical Committee CEN/TC 250 "Structural Eurocodes" (Secretariat: BSI, United Kingdom).

The responsible German body involved in its preparation was *DIN-Normenausschuss Bauwesen* (DIN Standards Committee Building and Civil Engineering), Working Committee NA 005-08-16 AA "Design of structures (national Mirror Committee to CEN/TC 250/SC 3, ISO/TC 167/SC 1)".

This standard includes Amendment A1 approved by CEN on 17 January 2017 and Corrigendum 1.

The start and finish of text introduced or altered by amendment and corrigendum is indicated in the text by tags A_1 A_1 and A_2 A_2 .

Amendments

This standard differs from DIN EN 1993-1-6:2010-12 as follows:

a) Amendment A1 has been incorporated.

Previous editions

DIN 18800-4: 1990-11, 2008-11 DIN V ENV 1993-1-6: 2002-05 DIN EN 1993-1-6: 2007-07, 2010-12 DIN EN 1993-1-6 Corrigendum 1: 2009-11

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 1993-1-6

February 2007

+ AC April 2009

+ A1

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ICS 91.010.30; 91.080.13

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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CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This amendment A1 modifies the European Standard EN 1993-1-6:2007; it was approved by CEN on 17 January 2017.

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This amendment 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-CENELEC 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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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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.

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

European 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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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 EN1993-1-1. Special considerations for specific applications are included in the relevant application parts of EN1993.

(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 EN1993-1-10.

(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 EN1090-2.

(15) This Standard does not cover the aspects of leakage.

(16) This Standard is intended for application to structures within the following limits:

design metal temperatures within the range -50° C to $+300^{\circ}$ C; radius to thickness ratios within the range 20 to 5000.

NOTE: It should be noted that the stress design rules of this standard may be rather conservative if applied to some geometries and loading conditions for relatively thick-walled shells.

1.2 Normative references

(1) This European 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1090-2	<i>Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures;</i>		
EN 1990	Basis of structural design;		
EN 1991	Eurocode 1: Actions on structures ;		
EN 1993	Eurocode 3: Design of steel structures:		
A1) Part 1.1	:2005: (A) General rules and rules for buildings;		
Part 1.3:	Cold formed thin gauged members and sheeting;		
Part 1.4:	Stainless steels;		
Part 1.5:	Plated structural elements;		
Part 1.9:	Fatigue strength of steel structures;		
Part 1.10:	Selection of steel for fracture toughness and through-thickness properties;		
Part 1.12:	Additional rules for the extension of EN 1993 up to steel grades S 700		
Part 2:	Steel bridges;		
Part 3.1:	Towers and masts;		
Part 3.2:	Chimneys;		
Part 4.1:	Silos;		
Part 4.2:	Tanks;		
Part 4.3:	Pipelines;		
Part 5:	Piling.		

1.3 Terms and definitions

The terms that are defined in EN 1990 for common use in the Structural Eurocodes apply to this Standard. Unless otherwise stated, the definitions given in ISO 8930 also apply in this Standard. Supplementary to EN 1993-1-1, for the purposes of this Standard, the following definitions apply:

1.3.1 Structural forms and geometry

1.3.1.1 shell

A structure or a structural component formed from a curved thin plate.

1.3.1.2 shell of revolution

A shell whose geometric form is defined by a middle surface that is formed by rotating a meridional generator line around a single axis through 2π radians. The shell can be of any length.

1.3.1.3 complete axisymmetric shell

A shell composed of a number of parts, each of which is a shell of revolution.

1.3.1.4 shell segment

A shell of revolution in the form of a defined shell geometry with a constant wall thickness: a cylinder, conical frustum, spherical frustum, annular plate, toroidal knuckle or other form.