Irish Standard
I.S. EN 1993-4-1:2007&AC:2009&A1:2017

Eurocode 3 - Design of steel structures - Part 4-1: Silos

I.S. EN 1993-4-1:2007&AC:2009&A1:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

EN 1993-4-1:2007/A1:2017 EN 1993-4-1:2007/AC:2009

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I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

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National Foreword

I.S. EN 1993-4-1:2007&AC:2009&A1:2017 is the adopted Irish version of the European Document EN 1993-4-1:2007, Eurocode 3 - Design of steel structures - Part 4-1: Silos

NSAI adopts all Eurocodes as Irish Standards.

Eurocodes permit certain design parameters to be selected nationally. In Ireland, the selection of National Design parameters (NDP's) is the responsibility of the Eurocodes Consultative Committee (NSAI TC 015). National Annexes are developed in accordance with CEN and NSAI procedures and include a public consultation process.

Where NSAI TC 015 considers it appropriate, NDP's are agreed and listed in Irish National Annexes to Eurocodes.

Eurocodes must always be used in conjunction with the accompanying National Annex (NA), where available. For example, I.S. EN 1991-1-4, Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions is to be used in conjunction with NA to I.S. EN 1991-1-4.

National annexes are reviewed as necessary e.g. when a new edition, an amendment or a corrigendum to a Eurocode is issued. The national annex identifies what amendments/corrigenda are addressed. The user should check that the National Annex addresses the latest changes to the Eurocode. Previews of all documents are available on www.standards.ie. Any questions should be directed to NSAI.

Where an Irish National Annex to a Eurocode has not been prepared, the user must make sure that the general requirements of I.S. EN 1990 and the accompanying Irish National Annex are complied with.

Where a Eurocode has been changed (revised/amended/corrected) and the National Annex has yet to be revised to account for the change(s), the National Annex for the previous version is available. Engineering judgement must be applied if using guidance contained therein. Where no National Annex exists, and NSAI TC 015 considers it appropriate to develop one, NDP's will be agreed and listed in new Irish National Annexes to Eurocodes. In the interim, Engineering Judgement must be applied e.g. when selecting appropriate parameters for NDP's.

Information on Eurocodes and the related national annexes is available from www.nsai.ie.

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

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1993-4-1:2007/A1

June 2017

ICS 65.040.20; 91.010.30; 91.080.13

English Version

Eurocode 3 - Design of steel structures - Part 4-1: Silos

Eurocode 3 - Calcul des structures en acier - Partie 4-1 : Silos

Eurocode 3 - Bemessung und Konstruktion von Stahlbauten - Teil 4-1: Silos

This amendment A1 modifies the European Standard EN 1993-4-1:2007; it was approved by CEN on 3 March 2017.

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 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

Ref. No. EN 1993-4-1:2007/A1:2017 E

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European foreword

This document (EN 1993-4-1:2007/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 June 2018, and conflicting national standards shall be withdrawn at the latest by June 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.

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

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1993-4-1:2007/AC

April 2009
Avril 2009
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ICS 65.040.20; 91.010.30; 91.080.10

English version
Version Française
Deutsche Fassung

Eurocode 3 - Design of steel structures - Part 4-1: Silos

Eurocode 3 - Calcul des structures en acier - Partie 4-1: Silos

Eurocode 3 - Bemessung und Konstruktion von Stahlbauten - Teil 4-1: Silos

This corrigendum becomes effective on 22 April 2009 for incorporation in the three official language versions of the EN.

Ce corrigendum prendra effet le 22 avril 2009 pour incorporation dans les trois versions linguistiques officielles de la EN.

Die Berichtigung tritt am 22.April 2009 zur Einarbeitung in die drei offiziellen Sprachfassungen der EN in Kraft.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No.:EN 1993-4-1:2007/AC:2009 D/E/F

1) Modifications to "Foreword"

"**Additional information specific to EN1993-4-1**"*, last paragraph, replace the reference* "2.10" *with* "2.9"*.*

"**National Annex for EN1993-4-1**"*, replace* "5.4.4 (2), (3) and (4)" *with* "5.4.4 (2), (3)b) and (3)c)"*.*

2) Modification to 1.1

Paragraph "(8)"*, replace* "10 tonnes" *with* "100 kN (10 tonnes)"*.*

3) Modifications to 1.2

Reference to "EN 1991"*, in the line:*

"Part 1.5: *Actions on structures – Accidental actions;*"*,*

replace "Part 1.5" *with* "Part 1.7"*.*

Title of "EN 10025"*, correct the title into* "*Hot rolled products of structural steels*"*.*

Reference to "EN 10147"*, replace* "EN 10147" *with* "EN 10149"*.*

4) Modification to 1.7.1

Paragraph "(1)"*,* "Figure 1.2"*, Subfigure* "a)"*, Subtitle, replace* "general coordinate system" *with* "global coordinate system"*.*

5) Modification to 1.7.2

Paragraph "(4)"*,* "Figure 1.3"*, Subfigure* "a)"*, Subtitle, replace* "general coordinate system" *with* "global coordinate system"*.*

6) Modification to 2.6

Paragraph "(3)"*, replace* "EN 10147" *with* "EN 10149"*.*

7) Modification to 4.3.1

Paragraph "(8)"*,* "**NOTE**"*, replace* "n_{ew} = 16" *with* "$n_{ew} = 15\varepsilon$"*.*

8) Modification to 4.3.3

Paragraph "(5)"*, replace* "(see 2.3)" *with* "(see 2.2)"*.*

9) Modification to 4.4

Paragraph "(6)"*, delete the whole* "**NOTE 2**" *and replace* "**NOTE 1**" *with* "**NOTE**"*.*

10)Modifications to 5.3.2.3

Paragraph "(3)"*,* "**NOTE**"*, replace* "are given in below" *with* "are given in the table below"*.*

Paragraph "(3)"*, delete the last sentence of the* "**NOTE**"*:* "The single welded lap joint should not be used if more than 20% of the $\sigma_{e,Ed}$ in expression 5.4 derives from bending moments."

and add it to the "normal"-formatted paragraph "(3)"*.*

11) Modification to 5.3.2.6

Paragraph "(5)"*, Equation* "(5.55)"*, replace:*

"$\ell_o = \dfrac{\tau_{x\theta,Ed,\max}}{\left(\dfrac{d\tau_{x\theta,Ed}}{dx}\right)}$ (5.55)"

with:

"$\ell_0 = \dfrac{\tau_{x\theta,Ed,\max}}{d\tau_{x\theta,Ed}/dy}$ (5.55)".

12) Modification to 5.3.4.1

Paragraph "(6)"*, delete the whole* "**NOTE 1**" *and replace* "**NOTE 2**" *with* "**NOTE**"*.*

13) Modifications to 5.3.4.3.3

Paragraph "(5)"*, replace Equation* "(5.70)"*:*

"$n_{x,Rd} = A_s f_y/\gamma_{M1}$ (5.70)"

with the following one:

"$n_{x,Rd} = A_{eff} f_y/(d_s \gamma_{M0})$",

and right under "where:"*, add:*

"d_s is the distance between the stringer stiffeners;
A_{eff} is the effective cross-sectional area of the stringer stiffener;".

14) Modification to 5.4.4

Paragraph "(3)"*, replace* "one of the three following criteria" *with* "one of the following criteria"*.*

15) Modification to 6.3.2.5

Paragraph "(5)"*,Equation* "(6.11)"*, replace the current last term* "$-\left(\dfrac{6}{t_h^2}\right)F_{e,Ed}x_h$" *with the following one* "$-\left(\dfrac{6}{t_h^2}\right)F_h x_h$".

16) Modifications to 8.2.3

Paragraph "(4)"*, replace equation number* "(8.19)" *with* "(8.19a)"*.*

Paragraph "(4)"*, replace equation number* "(8.20)" *with* "(8.19b)"*.*

Paragraph "(4)"*, replace equation number* "(8.21)" *with* "(8.20)"*.*

Paragraph "(4)"*, between Equation* "(8.21)" *and* "where (see figure 8.6):"*, add the following new equations:*

$$"n_{v,Ed} = n_{xc,Ed} + n_{\phi h,Ed}\cos\beta \qquad (8.21a)$$

$$n_{r,Ed} = n_{\phi h,Ed}\sin\beta \qquad (8.21b)".$$

Paragraph "(4)"*, in Equations* "(8.19a)" *up to and including* "(8.25)" *[except in the newly inserted formulae* "(8.21a)" *and* "(8.21b)"*], replace* "$n_{xc,Ed}$" *with* "$n_{v,Ed}$"*.*

Paragraph "(4)"*, in Equations* "(8.19a)" *up to and including* "(8.25)" *[except in the newly inserted formulae* "(8.21a)" *and* "(8.21b)"*], replace* "$n_{\phi h,Ed}$" *with* "$n_{r,Ed}$"*.*

17) Modification to 8.3.2.3

Paragraph "(2)"*, Equation* "(8.27)"*, replace* "ℓ_{eh}" *with* "ℓ_{oh}"*.*

18) Modification to 8.3.4.4

Paragraph "(2)"*, Equation* "(8.42)"*, replace* "σ_p" *with* "σ_c"*.*

19) Modification to 9.2.3

Paragraph "(1)"*,* "**NOTE**"*, replace* "shown in figures 9.1, 9.2 and 9.3" *with* "shown in figures 9.1 and 9.2"*.*

20) Modification to 9.4.1

Paragraph "(2)"*, replace* "should be designed for:" *with* "should be designed for (see figure 9.3):"*.*

21) Modification to 9.5.2

Paragraph "(5)"*, replace* "be agreed between the designer and/or the fabricator" *with* "be agreed between the client, the designer and the fabricator"*.*

22) Modification to A.3.2.1

Paragraph "(6)"*,* "**NOTE**"*, replace the text of the note with the following one:* "The National Annex may choose the value of j_i. The recommended values of j_i are given in the table below for different joint configurations. The single welded lap joint should not be used if more than 20% of $\sigma_{e,Ed}$ in expression 5.4 derives from bending moments."

23) Modification to A.3.2.2

Paragraph "(2)"*, replace* "*t*/2" *with* "*t*"*.*

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1993-4-1

February 2007

ICS 65.040.20; 91.010.30; 91.080.10

Supersedes ENV 1993-4-1:1999

English Version

Eurocode 3 - Design of steel structures - Part 4-1: Silos

Eurocode 3 - Calcul des structures en acier - Partie 4-1: Silos

Eurocode 3 - Bemessung und Konstruktion von Stahlbauten - Teil 4-1: Silos

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

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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 1993-4-1:2007: E

Contents

Foreword

This European Standard EN 1993-4-1, "Eurocode 3: Design of steel structures – Part 4-1: Silos", 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 1993-4-1:1999.

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.

Background of the Eurocode programme

In 1975, the Commission of the European Community decided on an action programme in the field of construction, based on article 95 of the Treaty. The objective of the programme was the elimination of technical obstacles to trade and the harmonisation of technical specifications.

Within this action programme, the Commission took the initiative to establish a set of harmonised technical rules for the design of construction works which, in a first stage, would serve as an alternative to the national rules in force in the Member States and, ultimately, would replace them.

For fifteen years, the Commission, with the help of a Steering Committee with Representatives of Member States, conducted the development of the Eurocodes programme, which led to the first generation of European codes in the 1980's.

In 1989, the Commission and the Member States of the EU and EFTA decided, on the basis of an agreement[1)] between the Commission and CEN, to transfer the preparation and the publication of the Eurocodes to the CEN through a series of Mandates, in order to provide them with a future status of European Standard (EN). This links de facto the Eurocodes with the provisions of all the Council's Directives and/or Commission's Decisions dealing with European standards (e.g. the Council Directive 89/106/EEC on construction products - CPD - and Council Directives 93/37/EEC, 92/50/EEC and 89/440/EEC on public works and services and equivalent EFTA Directives initiated in pursuit of setting up the internal market).

The Structural Eurocode programme comprises the following standards generally consisting of a number of Parts:

EN1990	Eurocode: Basis of structural design
EN1991	Eurocode 1: Actions on structures
EN1992	Eurocode 2: Design of concrete structures
EN1993	Eurocode 3: Design of steel structures
EN1994	Eurocode 4: Design of composite steel and concrete structures
EN1995	Eurocode 5: Design of timber structures

1) Agreement between the Commission of the European Communities and the European Committee for Standardisation (CEN) concerning the work on EUROCODES for the design of building and civil engineering works (BC/CEN/03/89).

EN1996	Eurocode 6: Design of masonry structures
EN1997	Eurocode 7: Geotechnical design
EN1998	Eurocode 8: Design of structures for earthquake resistance
EN1999	Eurocode 9: Design of aluminium structures

Eurocode standards recognise the responsibility of regulatory authorities in each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level where these continue to vary from State to State.

Status and field of application of Eurocodes

The Member States of the EU and EFTA recognise that EUROCODES serve as reference documents for the following purposes:

- as a means to prove compliance of building and civil engineering works with the essential requirements of Council Directive 89/106/EEC, particularly Essential Requirement N°1 - Mechanical resistance and stability - and Essential Requirement N°2 - Safety in case of fire ;
- as a basis for specifying contracts for construction works and related engineering services ;
- as a framework for drawing up harmonised technical specifications for construction products (ENs and ETAs)

The Eurocodes, as far as they concern the construction works themselves, have a direct relationship with the Interpretative Documents[2)] referred to in Article 12 of the CPD, although they are of a different nature from harmonised product standards[3)]. Therefore, technical aspects arising from the Eurocodes work need to be adequately considered by CEN Technical Committees and/or EOTA Working Groups working on product standards with a view to achieving full compatibility of these technical specifications with the Eurocodes.

The Eurocode standards provide common structural design rules for everyday use for the design of whole structures and component products of both a traditional and an innovative nature. Unusual forms of construction or design conditions are not specifically covered and additional expert consideration will be required by the designer in such cases.

National Standards implementing Eurocodes

The National Standards implementing Eurocodes will comprise the full text of the Eurocode (including any annexes), as published by CEN, which may be preceded by a National title page and National foreword, and may be followed by a National Annex.

The National Annex may only contain information on those parameters which are left open in the Eurocode for national choice, known as Nationally Determined Parameters, to be used for the design of buildings and civil engineering works to be constructed in the country concerned, i.e. :

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2) According to Art. 3.3 of the CPD, the essential requirements (ERs) shall be given concrete form in interpretative documents for the creation of the necessary links between the essential requirements and the mandates for harmonised ENs and ETAGs/ETAs.

3) According to Art. 12 of the CPD the interpretative documents shall :

a) give concrete form to the essential requirements by harmonising the terminology and the technical bases and indicating classes or levels for each requirement where necessary ;

b) indicate methods of correlating these classes or levels of requirement with the technical specifications, e.g. methods of calculation and of proof, technical rules for project design, etc. ;

c) serve as a reference for the establishment of harmonised standards and guidelines for European technical approvals.

The Eurocodes, de facto, play a similar role in the field of the ER 1 and a part of ER 2.

- values and/or classes where alternatives are given in the Eurocode,
- values to be used where a symbol only is given in the Eurocode,
- country specific data (geographical, climatic, etc), e.g. snow map,
- the procedure to be used where alternative procedures are given in the Eurocode.

It may also contain:
- decisions on the application of informative annexes,
- references to non-contradictory complementary information to assist the user to apply the Eurocode.

Links between Eurocodes and harmonised technical specifications (ENs and ETAs) for products

There is a need for consistency between the harmonised technical specifications for construction products and the technical rules for works[4]. Furthermore, all the information accompanying the CE Marking of the construction products which refer to Eurocodes should clearly mention which Nationally Determined Parameters have been taken into account.

Additional information specific to EN1993-4-1

EN 1993-4-1 gives design guidance for the structural design of silos.

EN 1993-4-1 gives design rules that supplement the generic rules in the many parts of EN 1993-1.

EN 1993-4-1 is intended for clients, designers, contractors and relevant authorities.

EN 1993-4-1 is intended to be used in conjunction with EN 1990, with EN 1991-4, with the other Parts of EN 1991, with EN 1993-1-6 and EN 1993-4-2, with the other Parts of EN 1993, with EN 1992 and with the other Parts of EN 1994 to EN 1999 relevant to the design of silos. Matters that are already covered in those documents are not repeated.

Numerical values for partial factors and other reliability parameters are recommended as basic values that provide an acceptable level of reliability. They have been selected assuming that an appropriate level of workmanship and quality management applies.

Safety factors for ‘product type’ silos (factory production) can be specified by the appropriate authorities. When applied to ‘product type’ silos, the factors in 2.10 are for guidance purposes only. They are provided to show the likely levels needed to achieve consistent reliability with other designs.

National Annex for EN1993-4-1

This standard gives alternative procedures, values and recommendations for classes with notes indicating where national choices may have to be made. Therefore the National Standard implementing EN 1993-4-1 should have a National Annex containing all Nationally Determined Parameters to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

National choice is allowed in EN 1993-4-1 through:

- 2.2 (1)
- 2.2 (3)

[4] see Art.3.3 and Art.12 of the CPD, as well as clauses 4.2, 4.3.1, 4.3.2 and 5.2 of ID 1.

- 2.9.2.2 (3)
- 3.4 (1)
- 4.1.4 (2) and (4)
- 4.2.2.3 (6)
- 4.3.1 (6) and (8)
- 5.3.2.3 (3)
- 5.3.2.4 (10), (12) and (15)
- 5.3.2.5 (10) and (14)
- 5.3.2.6 (3) and (6)
- 5.3.2.8 (2)
- 5.3.3.5 (1) and (2)
- 5.3.4.3.2 (2)
- 5.3.4.3.3 (2) and (5)
- 5.3.4.3.4 (5)
- 5.3.4.5 (3)
- 5.4.4 (2), (3) and (4)
- 5.4.7 (3)
- 5.5.2 (3)
- 5.6.2 (1) and (2)
- 6.1.2 (4)
- 6.3.2.3 (2) and (4)
- 6.3.2.7 (3)
- 7.3.1 (4)
- 8.3.3 (4)
- 8.4.1 (6)
- 8.4.2 (5)
- 8.5.3 (3)
- 9.5.1 (3) and (4)
- 9.5.2 (5)
- 9.8.2 (1) and (2)
- A.2 (1) and (2)
- A.3.2.1 (6)
- A.3.2.2 (6)
- A.3.2.3 (2)
- A.3.3 (1), (2) and (3)
- A.3.4 (4)

1 General

1.1 Scope

(1) Part 4.1 of Eurocode 3 provides principles and application rules for the structural design of steel silos of circular or rectangular plan-form, being free standing or supported.

(2) The provisions given in this Part supplement modify or supersede the equivalent provisions given in EN 1993-1.

(3) This part is concerned only with the requirements for resistance and stability of steel silos. For other requirements (such as operational safety, functional performance, fabrication and erection, quality control, details like man-holes, flanges, filling devices, outlet gates and feeders etc.), see the relevant standards.

(4) Provisions relating to special requirements of seismic design are provided in EN 1998-4, which complements or adapts the provisions of Eurocode 3 specifically for this purpose.

(5) The design of supporting structures for the silo are dealt with in EN 1993-1-1. The supporting structure is deemed to consist of all structural elements beneath the bottom flange of the lowest ring of the silo, see figure 1.1.

(6) Foundations in reinforced concrete for steel silos are dealt with in EN 1992 and EN 1997.

(7) Numerical values of the specific actions on steel silos to be taken into account in the design are given in EN 1991-4 Actions in Silos and Tanks.

(8) This Part 4.1 does not cover:
- resistance to fire;
- silos with internal subdivisions and internal structures;
- silos with capacity less than 10 tonnes;
- cases where special measures are necessary to limit the consequences of accidents.

(9) Where this standard applies to circular planform silos, the geometric form is restricted to axisymmetric structures, but the actions on them may be unsymmetrical, and their supports may induce forces in the silo that are not axisymmetrical.

1.2 Normative references

This European Standard incorporates, by dated and undated reference, provisions from other standards. 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 the 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 *Execution of steel structures;*

EN 1990 *Eurocode: Basis of design;*

EN 1991 *Eurocode 1: Actions on structures;*

Part 1.1 *Actions on structures – Densities, self-weight and imposed loads for buildings;*

Part 1.2: *Actions on structures – Actions on structures exposed to fire;*

Part 1.3: *Actions on structures – Snow loads;*

Part 1.4: *Actions on structures – Wind loads;*