

**NATIONAL ANNEX
TO STANDARD**

SFS-EN 1993-4-1 EUROCODE 3: DESIGN OF STEEL STRUCTURES

Part 4-1: Silos

Preface

This national annex is used together with Standard SFS-EN 1993-4-1 + AC .

This national annex sets out:

- a) The national parameters for the following paragraphs in Standard SFS-EN 1993-4-1 + AC where national selection is permitted:

2.2(1)	5.3.4.3.2 (2)	8.4.1 (6)
2.2(3)	5.3.4.3.3 (2) ja (5)	8.4.2 (5)
2.9.2.2(3)P	5.3.4.3.4(5)	8.5.3 (3)
3.4 (1)	5.3.4.5 (3)	9.5.1 (3) ja (4)
4.1.4 (2) ja (4)	5.4.4 (2) ja (3)	9.5.2 (5)
4.2.2.3 (6)	5.4.7 (3)	9.8.2 (1) ja (2)
4.3.1 (6) ja (8)	5.5.2 (3)	A.2 (1) ja (2)
5.3.2.3 (3)	5.6.2 (1) ja (2)	A.3.2.1 (6)
5.3.2.4 (10), (12) ja (15)	6.1.2 (4)	A.3.2.2 (6)
5.3.2.5 (10) ja (14)	6.3.2.3 (2) ja (4)	A.3.2.3 (2)
5.3.2.6 (3) ja (6)	6.3.2.7 (3)	A.3.3 (1), (2) ja (3)
5.3.2.8 (2)	7.3.1 (4)	A.3.4 (4).
5.3.3.5 (1) ja (2)	8.3.3 (4) .	

- b) Guidance for the use of informative Annexes A, B and C.

2.2 Reliability differentiation

2.2(1)

The recommended consequence classes should be used, see clause 2.2(3)

2.2(3)

The recommended consequence classes and recommended class boundaries should be used.

2.9 Action effects for load state verifications

2.9.2.2(3)P

The recommended values should be used.

3.4 Special alloy steels

3.4(1)

The mechanical properties of non- standardised alloy steels should be specified case by case or according to the valid product approval.

4.1.4 Allowance for corrosion and abrasion

4.1.4(2)

The recommended value should be used, if it is applicable to the case considered.

4.1.4(4)

Appropriate values should be determined reliably case by case.

4.2.2.3 Consequence class 2

4.2.2.3(6)

The recommended value should be used.

4.3.1 Modelling of a structural box

4.3.1(6)

The recommended value should be used.

4.3.1(8)

The recommended value should be used.

5.3.2.3 Plastic limit state

5.3.2.3(3)

The recommended values should be used.

5.3.2.4 Buckling under axial compression

5.3.2.4(10)

The recommended value should be used.

5.3.2.4(12)

The recommended values should be used.

5.3.2.4(15)

The recommended values should be used.

5.3.2.5 Buckling under external pressure, internal partial vacuum and wind

5.3.2.5(10)

The recommended value should be used.

5.3.2.5(14)

The recommended value should be used.

5.3.2.6 Shell share

5.3.2.6(3)

The recommended value should be used.

5.3.2.6(6)

The recommended value should be used.

5.3.2.8 Fatigue, LS4

5.3.2.8(2)

The recommended value should be used, if the use of the silo does not require other value to be used. See standard SFS-EN 1993-1-9.

5.3.3.5 Membrane shear

5.3.3.5(1)

The recommended value should be used.

5.3.3.5(2)

The recommended value should be used.

5.3.4.3.2 Unstiffened wall

5.3.4.3.2(2)

The recommended value should be used.

5.3.4.3.3 Stiffened wall treated as an orthotropic shell

5.3.4.3.3(2)

The recommended value should be used.

5.3.4.3.3(5)

The recommended value should be used.

5.3.4.3.4 Stiffened wall treated as carrying axial compression only in the stiffeners

5.3.4.3.4(5)

The recommended value should be used.

5.3.4.5 Buckling under external pressure, partial vacuum and wind

5.3.4.5(3)

The recommended value should be used.

5.4.4 Discretely supported cylindrical shell

5.4.4(2)

The recommended values should be used.

5.4.4(3)b)

The recommended value should be used.

5.4.4(3)c)

The recommended value should be used.

5.4.7 Anchorage at the base of a silo

5.4.7(3)

The recommended values should be used.

5.5.2 Rectangular openings

5.5.2(3)

The recommended value should be used.

5.6.2 Deflections

5.6.2(1)

The recommended value should be used. Characteristic load combination according to standard EN 1990 and its National Annex should be used.

5.6.2(2)

The recommended values should be used. Characteristic load combination according to standard EN 1990 and its National Annex should be used.

6.1.2 Hopper wall design

6.1.2(4)

The recommended value should be used.

6.3.2.3 Rupture at the transition junction

6.3.2.3(2)

The recommended value should be used.

6.3.2.3(4)

The recommended value should be used.

6.3.2.7 Buckling of hoppers

6.3.2.7(3)

The recommended value should be used.

7.3.1 Shell or unsupported roofs

7.3.1(4)

The recommended value should be used.

8.3.3 Resistance to in-plane buckling

8.3.3(4)

The recommended value should be used.

8.4.1 Uniformly supported transition junctions

8.4.1(6)

The recommended values should be used.

8.4.2 Transition junction ring girder

8.4.2(5)

The recommended values should be used.

8.5.3 Base ring

8.5.3(3)

The recommended value should be used.

9.5.1 Forces in internal ties due to solids pressure on them

9.5.1(3)

The recommended values should be used.

9.5.1(4)

The recommended values should be used.

9.5.2 Modelling of ties

9.5.2(5)

The recommended value should be used.

9.8.2 Deflections

9.8.2(1)

The recommended values should be used. Characteristic load combination according to standard EN 1990 and its National Annex should be used.

9.8.2(2)

The recommended value should be used. Characteristic load combination according to standard EN 1990 and its National Annex should be used.

Annex A

Simplified rules for circular silos in consequence class 1

Annex A may be used. In additions the issues given in this National Annex should be taken into account.

A.2 Action effect assessment

A.2(1)

The recommended value should be used.

A.2(2)

The recommended value should be used.

A.3.2.1 Plastic limit state

A.3.2.1(6)

The recommended values should be used. See also clause 5.3.2.3(3).

A.3.2.2 Axial compression

A.3.2.2(6)

The recommended value should be used.

A.3.2.3 External pressure, partial internal vacuum and wind

A.3.2.3(2)

The recommended values should be used.

A.3.3 Conical welded hoppers

A.3.3(1)

The recommended value should be used.

A.3.3(2)

The recommended value should be used.

A.3.3(3)

The recommended values should be used.

A.3.4 Transition junction

A.3.4(4)

The recommended value should be used.

Annex B

Expressions for membrane stresses in conical hoppers

Annex B may be used.

Annex C

Distribution of wind pressure around circular silo structures

Annex C may be used.