

***NATIONAL ANNEX
TO
CYS EN 1993-1-6:2007
(Including A1:2017
and AC:2009)***

***Eurocode 3: Design of
steel structures***

***Part 1-6: Strength
and Stability of Shell
Structures***



NATIONAL ANNEX

TO

CYS EN 1993-1-6:2007+A1: 2017+AC: 2009

Eurocode 3: Design of steel structures

Part 1-6: Strength and Stability of Shell Structures

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INTRODUCTION

This National Annex has been prepared by CYS TC18 National Standardisation Technical Committee of the Cyprus Organization for Standardisation. (CYS).

NA 1 SCOPE

This National Annex is to be used together with CYS EN 1993-1-6:2007 (Including A1:2017, Corrigendum AC:2009). Any reference in the rest of this text to CYS EN 1993-1-6:2007 means the above document.

This National Annex gives:

- (a) Nationally determined parameters for the following clauses of CYS EN 1993-1-6:2007 where National choice is allowed (see Section NA 2):
- 3.1(4)
 - 4.1.4(3)
 - 5.2.4(1)
 - 6.2.1(6)
 - 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)
 - 8.6.3(5)
 - 8.8.2(9)
 - 8.8.2(18)
 - 8.8.2(20) (2 times)
 - 9.2.1(2)P
- (b) References to non-contradictory complementary information to assist the user to apply CYS EN 1993-1-6: 2007(see Section NA 3).

NA 2 NATIONALLY DETERMINED PARAMETERS

NA 2.1 Clause 3.1(4) Material properties

No information is given on material properties at temperatures exceeding 150°C.

NA 2.2 Clause 4.1.4(3) LS4: Fatigue

The recommended value of $N_f = 10\,000$ shall be used.

NA 2.3 Clause 5.2.4(1) Stress resultants and stresses

The recommended value of the radius to thickness ratio $(r/t)_{\min} = 25$ shall be used.

NA 2.4 Clause 6.2.1(6) Design values of stresses

The recommended value of $j = 3$ shall be used.

NA 2.5 Clause 6.3(5) Design by global numerical MNA or GMNA analysis

The recommended value of $n_{mps} = (66 - f_{yd}/15)$, where f_{yd} is in MPa, shall be used.

NA 2.6 Clause 7.3.1(1) Design values of total accumulated plastic strain

No recommendation is given for a more refined materially nonlinear global analysis.

NA 2.7 Clause 7.3.2(1) Total accumulated plastic strain limitation

The recommended value of $n_{p,eq} = 25$ for use in equation (7.5) of CYS EN 1993-1-6: 2007 shall be used.

NA 2.8 Clause 8.4.2(3) Out-of-roundness tolerance

Values for the out-of-roundness tolerance parameter $U_{r,max}$ as recommended in Table 8.1 of CYS EN 1993-1-6: 2007 are given in Table 8.1 (CYS).

Table 8.1 (CYS): Values for out-of-roundness tolerance parameter $U_{r,max}$

	Diameter range	$d[m] \leq 0,50m$	$0,50m < d[m] < 1,25m$	$1,25m \leq d[m]$
Fabrication tolerance quality class	Description	Recommended value of $U_{r,max}$		
Class A	Excellent	0,014	$0,007 + 0,0093(1,25-d)$	0,007
Class B	High	0,020	$0,010 + 0,0133(1,25-d)$	0,010
Class C	Normal	0,030	$0,015 + 0,0200(1,25-d)$	0,015

NA 2.9 Clause 8.4.3(2) Non-intended eccentricity tolerance

Values for the maximum permitted non-intended eccentricity $e_{a,max}$ as recommended in Table 8.2 of CYS EN 1993-1-6: 2007 are given in Table 8.2 (CYS).

Table 8.2 (CYS): Values for maximum permitted non-intended eccentricities

Fabrication tolerance quality class	Description	Recommended values for maximum permitted non-intended eccentricity $e_{a,max}$
Class A	Excellent	2 mm
Class B	High	3 mm
Class C	Normal	4 mm

NA 2.10 Clause 8.4.3(4) Non-intended eccentricity tolerance

Values for the non-intended eccentricity tolerance parameter $U_{e,max}$ as recommended in Table 8.3 of CYS EN 1993-1-6: 2007 are given in Table 8.3.

Table 8.3 (CYS): Values for non-intended eccentricity tolerances

Fabrication tolerance quality class	Description	Recommended value of $U_{e,max}$
Class A	Excellent	0,14
Class B	High	0,20
Class C	Normal	0,30

NA 2.11 Clause 8.4.4(4) Dimple tolerances

Values for the dimple tolerance parameter $U_{0,max}$ as recommended in Table 8.4 of CYS EN 1993-1-6: 2007 are given in Table 8.4 (CYS).

Table 8.4 (CYS): Values for dimple tolerance parameter $U_{0,max}$

Fabrication tolerance quality class	Description	Recommended value of $U_{0,max}$
Class A	Excellent	0,006
Class B	High	0,010
Class C	Normal	0,016

NA 2.12 Clause 8.4.5(1) Interface flatness tolerance

The recommended value of $\beta_0 = 0,1\% = 0,001$ radians shall be used.

NA 2.13 Clause 8.5.2(2) Design resistance (buckling strength)

Where no application standard exists for the form of construction involved, or the application standard does not define the relevant values of γ_{M1} , the value of γ_{M1} shall not be taken as smaller than the recommended value of $\gamma_{M1} = 1,1$.

NA 2.14 Clause 8.5.2(4) Design resistance (buckling strength)

The values of the following parameters shall be taken from Annex D of CYS EN 1993-1-6: 2007:

- α is the elastic buckling reduction factor
- β is the plastic range factor
- η is the interaction exponent
- λ_0 is the squash limit relative slenderness
- χ^h is the hardening limit

NA 2.15 Clause 8.6.3(5) Design value of resistance

The values of the following parameters shall be taken from Annex E of CYS EN 1993-1-6:2007:

- α is the elastic buckling reduction factor
- β is the plastic range factor
- η is the interaction exponent
- λ_0 is the squash limit relative slenderness
- χ^h is the hardening limit

NA 2.16 Clause 8.8.2(9) Design value of resistance

The recommended value of $\beta = 0,1$ radians shall be used.

NA 2.17 Clause 8.8.2(18) Design value of resistance

No additional requirements are defined for the assessment of appropriate patterns of imperfections.

NA 2.18 Clause 8.8.2(20) (2 times) Design value of resistance

The recommended value of $n_i = 25$ shall be used.

Values for the dimple tolerance parameter U_{n1} and U_{n2} as recommended in Table 8.5 of CYS EN 1993-1-6: 2007 are given in Table 8.5 (CYS).

Table 8.5 (CYS): Values for dimple imperfection amplitude parameters U_{n1} and U_{n2}

Fabrication tolerance quality class	Description	Recommended value of U_{n1}	Recommended value of U_{n2}
Class A	Excellent	0,010	0,010
Class B	High	0,016	0,016
Class C	Normal	0,025	0,025

NA 2.19 Clause 9.2.1(2)P General

Where no application standard exists for the form of construction involved, or the application standard does not define the relevant values of the partial factor for resistance to fatigue γ_{Mf} , the value of γ_{Mf} should be taken from CYS EN 1993-1-9: 2005/AC: 2009 but not smaller than $\gamma_{Mf} = 1,1$.

NA 3 REFERENCES TO NON-CONTRADICTIONARY COMPLEMENTARY INFORMATION

None

**NA to
CYS EN
1993-1-6:2007
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