

DIN EN 1993-1-6: 2010-12(E)

Eurocode_3: Design of steel structures_- Part_1-6: Strength and stability of shell structures (includes Corrigendum AC:2009)

Contents	Page
Foreword	4
1. General	5
1.1 Scope	5
1.2 Normative references	6
1.3 Terms and definitions	7
1.4 Symbols	12
1.5 Sign conventions	16
2 Basis of design and modelling	16
2.1 General	16
2.2 Types of analysis	16
2.3 Shell boundary conditions	18
3 Materials and geometry	19
3.1 Material properties	19
3.2 Design values of geometrical data	19
3.3 Geometrical tolerances and geometrical imperfections	19
4 Ultimate limit states in steel shells	20
4.1 Ultimate limit states to be considered	20
4.2 Design concepts for the limit states design of shells	21
5 Stress resultants and stresses in shells	24
5.1 Stress resultants in the shell	24
5.2 Modelling of the shell for analysis	24
5.3 Types of analysis	27
6 Plastic limit state (LS1)	27
6.1 Design values of actions	27
6.2 Stress design	27
6.3 Design by global numerical MNA or GMNA analysis	28
6.4 Direct design	29
7 Cyclic plasticity limit state (LS2)	29
7.1 Design values of actions	29
7.2 Stress design	30
7.3 Design by global numerical MNA or GMNA analysis	30
7.4 Direct design	31

8	Buckling limit state (LS3)	31
8.1	Design values of actions	31
8.2	Special definitions and symbols	31
8.3	Buckling-relevant boundary conditions	32
8.4	Buckling-relevant geometrical tolerances	32
8.5	Stress design	39
8.6	Design by global numerical analysis using MNA and LBA analyses	41
8.7	Design by global numerical analysis using GMNIA analysis	44
9	Fatigue limit state (LS4)	49
9.1	Design values of actions	49
9.2	Stress design	49
9.3	Design by global numerical LA or GNA analysis	50
	ANNEX A (normative)	51
	Membrane theory stresses in shells	51
A.1	General	51
A.2	Unstiffened cylindrical shells	52
A.3	Unstiffened conical shells	53
A.4	Unstiffened spherical shells	54
	ANNEX B (normative)	55
	Additional expressions for plastic collapse resistances	55
B.1	General	55
B.2	Unstiffened cylindrical shells	56
B.3	Ring stiffened cylindrical shells	58
B.4	Junctions between shells	60
B.5	Circular plates with axisymmetric boundary conditions	63
	ANNEX C (normative)	64
	Expressions for linear elastic membrane and bending stresses	64
C.1	General	64
C.2	Clamped base unstiffened cylindrical shells	65
C.3	Pinned base unstiffened cylindrical shells	67
C.4	Internal conditions in unstiffened cylindrical shells	69
C.5	Ring stiffener on cylindrical shell	70
C.6	Circular plates with axisymmetric boundary conditions	72
	ANNEX D (normative)	74
	Expressions for buckling stress AC Deleted text AC	74
D.1	Unstiffened cylindrical shells of constant wall thickness	74
D.2	Unstiffened cylindrical shells of stepwise variable wall thickness	84
D.3	Unstiffened lap jointed cylindrical shells	89
D.4	Unstiffened complete and truncated conical shells	91