

DIN EN 1993-4-2: 2010-12(E)

Eurocode_3: Design of steel structures_- Part_4-2: Tanks (includes Corrigendum AC:2009)

Contents

| | Page |
|--|-----------|
| Foreword | 4 |
| 1 General | 8 |
| 1.1 Scope | 8 |
| 1.2 Normative references | 8 |
| 1.3 Assumptions | 10 |
| 1.4 Distinction between principles and application rules | 10 |
| 1.5 Terms and definitions | 10 |
| 1.6 Symbols used in Part 4.2 of Eurocode 3 | 12 |
| 1.7 Sign conventions | 13 |
| 1.8 Units | 18 |
| 2 Basis of design | 19 |
| 2.1 Requirements | 19 |
| 2.2 Reliability differentiation | 19 |
| 2.3 Limit states | 19 |
| 2.4 Actions and environmental effects | 19 |
| 2.5 Material properties | 19 |
| 2.6 Geometrical data | 20 |
| 2.7 Modelling of the tank for determining action effects | 20 |
| 2.8 Design assisted by testing | 20 |
| 2.9 Action effects for limit state verifications | 20 |
| 2.10 Combinations of actions | 22 |
| 2.11 Durability | 22 |
| 3 Properties of materials | 23 |
| 3.1 General | 23 |
| 3.2 Structural steels | 23 |
| 3.3 Steels for pressure purposes | 23 |
| 3.4 Stainless steels | 24 |
| 3.5 Toughness requirements | 24 |
| 4 Basis for structural analysis | 25 |
| 4.1 Ultimate limit states | 25 |
| 4.2 Analysis of the circular shell structure of a tank | 25 |
| 4.3 Analysis of the box structure of a rectangular tank | 27 |
| 4.4 Equivalent orthotropic properties of corrugated sheeting | 28 |
| 5 Design of cylindrical walls | 29 |
| 5.1 Basis | 29 |
| 5.2 Distinction of cylindrical shell forms | 29 |
| 5.3 Resistance of the tank shell wall | 29 |
| 5.4 Considerations for supports and openings | 30 |
| 5.5 Serviceability limit states | 33 |
| 6 Design of conical hoppers | 34 |

| | | |
|----------------------------|--|-----------|
| 7 | Design of circular roof structures | 34 |
| 7.1 | Basis | 34 |
| 7.2 | Distinction of roof structural forms | 34 |
| 7.3 | Resistance of circular roofs | 35 |
| 7.4 | Considerations for individual structural forms | 35 |
| 7.5 | Serviceability limit states | 36 |
| 8 | Design of transition junctions at the bottom of the shell and supporting ring girders | 36 |
| 9 | Design of rectangular and planar-sided tanks | 37 |
| 9.1 | Basis | 37 |
| 9.2 | Distinction of structural forms | 37 |
| 9.3 | Resistance of vertical walls | 37 |
| 9.4 | Serviceability limit states | 38 |
| 10 | Requirements on fabrication, execution and erection with relation to design | 38 |
| 11 | Simplified design | 39 |
| 11.1 | General | 39 |
| 11.2 | Fixed roof design | 40 |
| 11.3 | Shell design | 46 |
| 11.4 | Bottom design | 50 |
| 11.5 | Anchorage design | 51 |
| Annex A [normative] | Actions on tanks | 53 |
| A.1 | General | 53 |
| A.2 | Actions | 53 |