DIN EN 1993-1-5: 2010-12(E)

Eurocode_3: Design of steel structures_- Part_1-5: Plated structural elements (includes Corrigendum AC:2009)

Content

Page

Foreword **4**

1 Introduction **5**

1.1 Scope 5
1.2 Normative references 5
1.3 Terms and definitions 5
1.4 Symbols 6

2 Basis of design and modelling **7**

2.1 General 7
2.2 Effective width models for global analysis 7
2.3 Plate buckling effects on uniform members 7
2.4 Reduced stress method 8
2.5 Non uniform members 8
2.6 Members with corrugated webs 8

3 Shear lag in member design **9**

3.1 General 9
3.2 Effective^{s} width for elastic shear lag 9
3.3 Shear lag at the ultimate limit state 12

4 Plate buckling effects due to direct stresses at the ultimate limit state **13**

4.1 General 13
4.2 Resistance to direct stresses 13
4.3 Effective cross section 13
4.4 Plate elements without longitudinal stiffeners 15
4.5 Stiffened plate elements with longitudinal stiffeners 18
4.6 Verification 21

5 Resistance to shear **21**

5.1 Basis 21
5.2 Design resistance 22
5.3 Contribution from the web 22
5.4 Contribution from flanges 25
5.5 Verification 25

6 Resistance to transverse forces **25**

6.1 Basis 25
6.2 Design resistance 26
6.3 Length of stiff bearing 26
6.4 Reduction factor χ_F for effective length for resistance 27
6.5 Effective loaded length 27
6.6 Verification 28

7 Interaction **28**

7.1 Interaction between shear force, bending moment and axial force 28
7.2 Interaction between transverse force, bending moment and axial force 29

8 Flange induced buckling **29**

9 Stiffeners and detailing **30**
9.1 General 30
9.2 Direct stresses 30
9.3 Shear 34
9.4 Transverse loads 35
10 Reduced stress method **36**
Annex A (informative) Calculation of critical stresses for stiffened plates **38**
Annex B (informative) Non uniform members **43**
Annex C (informative) Finite Element Methods of Analysis (FEM) **45**
Annex D (informative) Plate girders with corrugated webs **50**
Annex E (normative) Alternative methods for determining effective cross sections **53**