Eurocode 3: Design of steel structures
Part 1-12: Additional rules for the extension of EN 1993 up to steel grades S 700

Eurokoodeks 3: Teraskonstruktsioonide projekteerimine
Osa 1-12: Täiendavad reeglid standardi EN 1993 laiendamiseks kuni teraseni S 700

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1993-1-12:2007+NA:2010 sisaldab Euroopa standardi EN 1993-1-12:2007 identset ingliskeelset teksti ning rahvuslikku lisa NA:2010.	This Estonian Standard EVS-EN 1993-1-12:2007+NA:2010 consists of the identical English text of the European Standard EN 1993-1-12:2007 and the Estonian National Annex NA:2010.
Standard on kinnitatud Eesti Standardikeskuse 15.12.2010 käskkirjaga nr 20 ja on jõustunud sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with an order of the Estonian Centre for Standardisation dated 15.12.2010 and has been endorsed with a notification published in the official bulletin of the Estonian centre for Standardisation.!
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 28.02.2007.	Date of Availability of the European Standard is 28.02.2007.
Standard on kättesaadav Eesti Standardikeskusest.	This standard is available from the Estonian Centre for Standardisation.

ICS 91.010.30, 91.080.10

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1993-1-12

February 2007

ICS 91.010.30; 91.080.10

English Version

Eurocode 3 - Design of steel structures - Part 1-12: Additional rules for the extension of EN 1993 up to steel grades S 700

Eurocode 3 - Calcul des structures en acier - Partie 1-12 : Règles additionnelles pour l'utilisation de l'EN 1993 jusqu'à la nuance d'acier S 700

Eurocode 3: Bemessung und Konstruktion von Stahlbauten - Teil 1-12: Zusätzliche Regeln zur Erweiterung von EN 1993 auf Stahlsorten bis S 700

This European Standard was approved by CEN on 6 July 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Ref. No. EN 1993-1-12:2007: E

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Foreword

This European Standard EN 1993-1-12, “Eurocode 3: Design of steel structures: Part 1-12: Additional rules for the extension of EN 1993 up to steel grades S 700”, has been prepared by Technical Committee CEN/TC250 « Structural Eurocodes », the Secretariat of which is held by BSI. CEN/TC250 is responsible for all Structural Eurocodes.

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by August 2007, and conflicting National Standards shall be withdrawn at latest by March 2010.

According to the CEN-CENELEC Internal Regulations, the National Standard Organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

National annex for EN 1993-1-12

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. Therefore the National Standard implementing EN 1993-1-12 should have a National annex containing all Nationally Determined Parameters to be used for the design of steel structures to be constructed in the relevant country.

National choice is allowed in EN 1993-1-12 through:

- **2.1** (3.1(2))
- **2.1** (3.2.2(1))
- **2.1** (5.4.3(1))
- **2.1** (6.2.3(2))
- **2.8** (4.2(2))
- **3** (1)

1 General

1.1 Scope

(1) This EN 1993-1-12 gives rules that can be used in conjunction with parts

- EN1993-1-1
- EN 1993-1-2
- EN 1993-1-3
- EN 1993-1-4
- EN 1993-1-5
- EN 1993-1-6
- EN 1993-1-7
- EN 1993-1-8

- EN 1993-1-9
- EN 1993-1-10
- EN 1993-1-11
- EN 1993-2
- EN 1993-3-1
- EN 1993-3-2
- EN 1993-4-1
- EN 1993-4-2
- EN 1993-4-3
- EN 1993-5
- EN 1993-6

to enable steel structures to be designed with steel of grades greater than S460 up to S700.

(2) Where it is necessary to alter a rule in other parts to enable up to S700 to be used, it is stated what needs to be done, either by noting that a rule is not to be used with steel grades greater than S460, then giving the one that is required, or by giving an additional rule or rules.

1.2 Normative references

(1) This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 499 *Welding consumables – Covered electrodes for manual metal arc welding of non alloy and fine grain steels – Classification*

EN 10025-6 *Hot rolled products of structural steels - Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*

EN 10149-1 *Hot-rolled flat products made of high yield strength steels for cold forming – Part 1: General delivery conditions*

EN 10149-2 *Hot-rolled flat products made of high yield strength steels for cold forming – Part 2: Delivery conditions for thermomechanically rolled steels*

EN 12534 *Welding consumables – Wire electrodes, wires, rods and deposits for gas shielded metal arc welding of high strength steels – Classification*

EN 12535 *Welding consumables – Tubular cored electrodes for gas shielded metal arc welding of high strength steels – Classification*

1.3 Symbols

(1) Symbols used in this standard are defined in the standards referred to.

4.11 Additional rule:

For steel grades greater than S460 up to S700 longitudinal fillet welds in lap joints with steel grades greater than S460 up to S700 should not be longer than 50*a* unless the non-uniform stress distribution is taken into account in the design.

5.1.3 Not applicable to steels with grades greater than S460 up to S700.

5.1.4 Not applicable to steels with grades greater than S460 up to S700.

5.2.2.4 Not applicable to steels with grades greater than S460 up to S700.

6 Additional rules:

The rules for semi-rigid joints are not applicable for steels with grades greater than S460 up to S700. If non-linear plastic global analysis considering the partial plastification of members in plastic zones is used, connections between members shall only be on the basis of full-strength joints. If elastic global analysis is used, connection with partial-strength joints may be used, provided that the resistance of joints exceeds the actual internal forces and moments in the connected elements. In both cases the resistance of joints should be determined based on elastic distribution of forces over the components of a joint.

6.2.6.9 to 6.2.6.12 Additional rules:

The rules for column bases may only be used for steel grades greater than S460 up to S700, provided that the bolt failure mode is decisive for verification of base plates in bending on the tension side of connections and an elastic distribution of forces in anchor bolts is used.

7.1.1(4) Additional rule:

For steels with grades greater than S460 up to S700 the reduction factor is 0,8.

2.9 Additional rules to EN 1993-1-9

8(1) Additional rule:

For hybrid girders made of steels with flange grades greater than S460 up to S700 fulfilling the condition $f_{yf} \le \varphi_h f_{yw}$ the limitation $\Delta\sigma \le 1{,}5 f_y$ should be applied to the yield strength of the flange $f_y f$.

$\nu_h = f_{yf}/f_{yw}$

2.10 Additional rules to EN 1993-1-10

2.3.2(1) Additional rule:

Table 4 may also be used to determine the maximum permissible element thickness for steel grades greater than S460 up to S700.

NOTE 1 Linear interpolation can be used in applying Table 4. Most applications require σ_{Ed} values between $\sigma_{Ed} = 0{,}75 f_y(t)$ and $\sigma_{Ed} = 0{,}50 f_y(t)$. $\sigma_{Ed} = 0{,}25 f_y(t)$ is given for interpolation purposes. Extrapolations beyond the extreme values are not valid.

NOTE 2 For ordering products made of steels according to Table 4 the T_J – values should be specified.

NOTE 3 Table 2.1 has been derived for the guaranteed Charpy energy values CVN in the direction of the rolling of the product.