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# Eurocode 3: Stålkonstruktioner – Del 1-8: Samlinger

Eurocode 3: Design of steel structures – Part 1-8: Design of joints

DANSK STANDARD
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**DS-publikationen er på dansk og engelsk.**

**Denne publikation erstatter: DS/EN 1993-1-8:2005 og DS/EN 1993-1-8/AC:2006 som kun forelå i engelsksproget version. Der er ikke foretaget ændringer i denne nye udgave, ud over at den danske oversættelse er indføjet og AC er indarbejdet i den danske oversættelse.**

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**2010-03-25: Der er foretaget små rettelser i den danske tekst på side 103(da) og 113(da).**
**2017-05-16: Der er foretaget rettelse i formel 6.13b i den danske oversættelse.**

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## Kære bruger

Du kan holde dig ajour med den løbende udvikling på eurocode-området via hjemmesiden www.eurocodes.dk, hvor Dansk Standard bl.a. vil oplyse om ændringer til eurocodes, såsom: Tillæg (amendments), rettelsesblade (corrigenda), nationale annekser (NA), vejledninger etc.

På hjemmesiden vil du også kunne finde information om de DS-standardiseringsudvalg, der står bag arbejdet med eurocodes på de enkelte områder.

# NORME EUROPÉENNE

# EUROPÄISCHE NORM

May 2005

ICS 91.010.30

Supersedes ENV 1993-1-1:1992

English version

# Eurocode 3: Design of steel structures - Part 1-8: Design of joints

Eurocode 3: Calcul des structures en acier - Partie 1-8: Calcul des assemblages

Eurocode 3: Bemessung und Konstruktion von Stahlbauten - Teil 1-8: Bemessung von Anschlüssen

This European Standard was approved by CEN on 16 April 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**



Ref. No. EN 1993-1-8:2005: E

## Indholdsfortegnelse

This European Standard EN 1993, Eurocode 3: Design of steel structures, 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 November 2005, and conflicting National Standards shall be withdrawn at latest by March 2010.

This Eurocode supersedes ENV 1993-1-1.

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

## Background to the Eurocode programme

In 1975, the Commission of the European Community decided on an action programme in the field of construction, based on article 95 of the Treaty. The objective of the programme was the elimination of technical obstacles to trade and the harmonization of technical specifications.

Within this action programme, the Commission took the initiative to establish a set of harmonized technical rules for the design of construction works which, in a first stage, would serve as an alternative to the national rules in force in the Member States and, ultimately, would replace them.

For fifteen years, the Commission, with the help of a Steering Committee with Representatives of Member States, conducted the development of the Eurocodes programme, which led to the first generation of European codes in the 1980s.

In 1989, the Commission and the Member States of the EU and EFTA decided, on the basis of an agreement[1] between the Commission and CEN, to transfer the preparation and the publication of the Eurocodes to CEN through a series of Mandates, in order to provide them with a future status of European Standard (EN). This links *de facto* the Eurocodes with the provisions of all the Council's Directives and/or Commission's Decisions dealing with European standards (*e.g.* the Council Directive 89/106/EEC on construction products - CPD - and Council Directives 93/37/EEC, 92/50/EEC and 89/440/EEC on public works and services and equivalent EFTA Directives initiated in pursuit of setting up the internal market).

The Structural Eurocode programme comprises the following standards generally consisting of a number of Parts:

| | | |
|---|---|---|
| EN 1990 | Eurocode 0: | Basis of Structural Design |
| EN 1991 | Eurocode 1: | Actions on structures |
| EN 1992 | Eurocode 2: | Design of concrete structures |
| EN 1993 | Eurocode 3: | Design of steel structures |
| EN 1994 | Eurocode 4: | Design of composite steel and concrete structures |
| EN 1995 | Eurocode 5: | Design of timber structures |
| EN 1996 | Eurocode 6: | Design of masonry structures |
| EN 1997 | Eurocode 7: | Geotechnical design |
| EN 1998 | Eurocode 8: | Design of structures for earthquake resistance |
| EN 1999 | Eurocode 9: | Design of aluminium structures |

[1] Agreement between the Commission of the European Communities and the European Committee for Standardisation (CEN) concerning the work on EUROCODES for the design of building and civil engineering works (BC/CEN/03/89).

## Forord

Denne europæiske standard EN 1993, Eurocode 3: Stålkonstruktioner, er udarbejdet af teknisk komité CEN/TC250, Structural Eurocodes, hvis sekretariat varetages af BSI. CEN/TC250 er ansvarlig for alle eurocodekonstruktionsnormer.

Denne europæiske standard skal inden november 2005 have status som national standard, enten ved at der udgives en identisk tekst eller ved formel godkendelse, og modstridende nationale standarder skal være trukket tilbage senest marts 2010.

Denne eurocode erstatter ENV 1993-1-1.

I henhold til CEN/CENELEC's interne regler er de nationale standardiseringsorganisationer i følgende lande forpligtet til at implementere denne europæiske standard: Belgien, Cypern, Danmark, Estland, Finland, Frankrig, Grækenland, Holland, Irland, Island, Italien, Letland, Litauen, Luxembourg, Malta, Norge, Polen, Portugal, Schweiz, Slovakiet, Slovenien, Spanien, Storbritannien, Sverige, Tjekkiet, Tyskland, Ungarn og Østrig.

## Baggrund for eurocodeprogrammet

I 1975 besluttede Kommissionen for de Europæiske Fællesskaber at igangsætte et handlingsprogram på bygge- og anlægsområdet på grundlag af Traktatens artikel 95. Formålet med programmet var at fjerne tekniske handelshindringer og at harmonisere tekniske specifikationer.

Inden for dette handlingsprogram tog Kommissionen initiativ til at fastlægge et sæt harmoniserede tekniske regler for projektering af konstruktioner, der i første omgang skulle tjene som et alternativ til de gældende regler i medlemslandene og senere erstatte dem.

Med støtte fra en styrekomité med repræsentanter fra medlemslandene varetog Kommissionen i 15 år udviklingen af eurocodeprogrammet, der førte til den første generation af europæiske konstruktionsnormer i 1980'erne.

I 1989 besluttede Kommissionen og medlemslandene i EU og EFTA, på grundlag af en aftale[1)] mellem Kommissionen og CEN, at overdrage udarbejdelsen og offentliggørelsen af eurocodes til CEN i form af en række mandater med det formål at give disse eurocodes en fremtidig status som europæisk standard (EN). Dette forbinder *de facto* eurocodes med de bestemmelser i alle Rådets direktiver og/eller Kommissionens beslutninger, der vedrører europæiske standarder (fx Rådets Direktiv 89/106/EØF om byggevarer og Rådets Direktiv 93/37/EØF, 92/50/EØF og 89/440/EØF om offentlige bygge- og anlægsarbejder samt tilsvarende EFTA-direktiver igangsat med henblik på etableringen af det indre marked).

Eurocodeprogrammet for bærende konstruktioner omfatter følgende standarder, der som hovedregel består af et antal dele:

| | | |
|---|---|---|
| EN 1990 | Eurocode 0: | Basis of Structural Design |
| EN 1991 | Eurocode 1: | Actions on structures |
| EN 1992 | Eurocode 2: | Design of concrete structures |
| EN 1993 | Eurocode 3: | Design of steel structures |
| EN 1994 | Eurocode 4: | Design og composite steel and concrete structures |
| EN 1995 | Eurocode 5: | Design of timber structures |
| EN 1996 | Eurocode 6: | Design of masonry structures |
| EN 1997 | Eurocode 7: | Geotechnical design |
| EN 1998 | Eurocode 8: | Design of structures for earthquake resistance |
| EN 1999 | Eurocode 9: | Design of aluminium structures |

[1)] Aftale mellem Europa-Kommissionen og CEN om udarbejdelse af EUROCODES for projektering af bygge- og anlægsarbejder (BC/CEN/03/89).

contains to vary from State to State.

## Status and field of application of eurocodes

The Member States of the EU and EFTA recognize that Eurocodes serve as reference documents for the following purposes :

– as a means to prove compliance of building and civil engineering works with the essential requirements of Council Directive 89/106/EEC, particularly Essential Requirement N°1 – Mechanical resistance and stability – and Essential Requirement N°2 – Safety in case of fire;

– as a basis for specifying contracts for construction works and related engineering services;

– as a framework for drawing up harmonized technical specifications for construction products (ENs and ETAs)

The Eurocodes, as far as they concern the construction works themselves, have a direct relationship with the Interpretative Documents[2] referred to in Article 12 of the CPD, although they are of a different nature from harmonized product standards[3]. Therefore, technical aspects arising from the Eurocodes work need to be adequately considered by CEN Technical Committees and/or EOTA Working Groups working on product standards with a view to achieving full compatibility of these technical specifications with the Eurocodes.

The Eurocode standards provide common structural design rules for everyday use for the design of whole structures and component products of both a traditional and an innovative nature. Unusual forms of construction or design conditions are not specifically covered and additional expert consideration will be required by the designer in such cases.

## National Standards implementing Eurocodes

The National Standards implementing Eurocodes will comprise the full text of the Eurocode (including any annexes), as published by CEN, which may be preceded by a National title page and National foreword, and may be followed by a National annex.

The National annex may only contain information on those parameters which are left open in the Eurocode for national choice, known as Nationally Determined Parameters, to be used for the design of buildings and civil engineering works to be constructed in the country concerned, *i.e.* :
– values and/or classes where alternatives are given in the Eurocode,
– values to be used where a symbol only is given in the Eurocode,
– country specific data (geographical, climatic, etc.), *e.g.* snow map,
– the procedure to be used where alternative procedures are given in the Eurocode.
It may contain
– decisions on the application of informative annexes,
– references to non-contradictory complementary information to assist the user to apply the Eurocode.

[2] According to Art. 3.3 of the CPD, the essential requirements (ERs) shall be given concrete form in interpretative documents for the creation of the necessary links between the essential requirements and the mandates for harmonized ENs and ETAGs/ETAs.

[3] According to Art. 12 of the CPD the interpretative documents shall :
a) give concrete form to the essential requirements by harmonizing the terminology and the technical bases and indicating classes or levels for each requirement where necessary ;
b) indicate methods of correlating these classes or levels of requirement with the technical specifications, *e.g.* methods of calculation and of proof, technical rules for project design, etc. ;
c) serve as a reference for the establishment of harmonized standards and guidelines for European technical approvals.

The Eurocodes, *de facto*, play a similar role in the field of the ER 1 and a part of ER 2.

Eurocodestandarder anerkender det ansvar, som myndighederne i hvert medlemsland har, og har sikret deres ret til at fastsætte værdier med relation til sikkerhedsforhold i forskrifter på nationalt niveau, hvor disse værdier fortsat er forskellige fra medlemsland til medlemsland.

## Status og gyldighedsområde for eurocodes

Medlemslandene i EU og EFTA anerkender, at eurocodes anvendes som referencedokumenter til følgende formål:

– som et middel til at eftervise bygge- og anlægsarbejders overensstemmelse med de væsentlige krav i Rådets Direktiv 89/106/EØF, i særdeleshed Væsentligt Krav nr. 1 (ER1) – Mekanisk modstandsevne og stabilitet – og Væsentligt Krav nr. 2 (ER2) – Brandsikring

– som grundlag for at udforme kontrakter for bygge- og anlægsopgaver og tilhørende tekniske ydelser

– som ramme for udarbejdelsen af harmoniserede tekniske specifikationer for byggevarer (EN'er og ETA'er).

I det omfang eurocodes omhandler selve bygværket, har de en direkte sammenhæng med de basisdokumenter[2)], der henvises til i art. 12 i byggevaredirektivet, skønt de adskiller sig fra harmoniserede produktstandarder[3)]. Derfor er det nødvendigt, at CEN's tekniske komiteer og/eller EOTA's arbejdsgrupper, der beskæftiger sig med produktstandarder, tager tilstrækkeligt hensyn til de tekniske aspekter, som fremkommer i forbindelse med arbejdet med eurocodes, med det formål at der opnås fuldstændig overensstemmelse mellem disse tekniske specifikationer og eurocodes.

Eurocodestandarderne fastlægger fælles konstruktive projekteringsregler til almindelig brug ved projektering af bygværker og komponenter både af traditionel og innovativ art. Usædvanlige bygningsformer eller projekteringsbetingelser er ikke omfattet specifikt, og det vil i sådanne tilfælde være nødvendigt for den projekterende at anvende yderligere ekspertviden.

## Nationale standarder, der implementerer eurocodes

De nationale standarder, der implementerer eurocodes, vil indeholde eurocodens tekst i sin helhed (med annekser), som den er offentliggjort af CEN, og der kan foran være en national forside og et nationalt forord og til sidst et nationalt anneks.

Det nationale anneks må kun indeholde oplysninger om de parametre, for hvilke der i eurocoden er givet mulighed for national valgfrihed, kaldet nationalt bestemte parametre, der skal anvendes ved projektering af bygge- og anlægsarbejder til opførelse i det pågældende land, dvs.:

– værdier og/eller klasser, hvor eurocoden indeholder alternativer
– værdier, der skal anvendes, hvor der kun er angivet et symbol i eurocoden
– landespecifikke data (geografiske, klimatiske, osv.) fx snekort
– de fremgangsmåder, der skal følges, hvis der er angivet alternative fremgangsmåder i eurocoden.

Det kan indeholde:

– beslutninger om anvendelsen af informative annekser
– henvisninger til ikke-modstridende supplerende oplysninger, der er en hjælp for brugeren af eurocoden.

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2) I henhold til art. 3.3 i byggevaredirektivet skal de væsentlige krav konkretiseres i basisdokumenter for at skabe de nødvendige forbindelser mellem de væsentlige krav og mandaterne for de harmoniserede EN og ETAG/ETA.

3) I henhold til art. 12 i byggevaredirektivet skal basisdokumenterne:

a) konkretisere de væsentlige krav ved at harmonisere terminologien og det tekniske grundlag og angive klasser eller niveauer for hvert enkelt krav, hvor det er nødvendigt

b) angive metoder til korrellering af disse klasser eller kravniveauer med de tekniske specifikationer: fx metoder til beregning og eftervisning, tekniske projekteringsregler osv.

c) fungere som reference for etableringen af harmoniserede standarder og retningslinjer for europæiske tekniske godkendelser.

Eurocodes spiller *de facto* samme rolle med hensyn til ER 1 og en del af ER 2.

**products**

There is a need for consistency between the harmonized technical specifications for construction products and the technical rules for works[4]. Furthermore, all the information accompanying the CE Marking of the construction products which refer to Eurocodes should clearly mention which Nationally Determined Parameters have been taken into account.

## National annex for EN 1993-1-8

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. The National Standard implementing EN 1993-1-8 should have a National Annex containing all Nationally Determined Parameters for the design of steel structures to be constructed in the relevant country.

National choice is allowed in EN 1993-1-8 through:

- 2.2(2)
- 1.2.6 (Group 6: Rivets)
- 3.1.1(3)
- 3.4.2(1)
- 5.2.1(2)
- 6.2.7.2(9)

[4] see Art.3.3 and Art.12 of the CPD, as well as clauses 4.2**,** 4.3.1, 4.3.2 and 5.2 of ID 1.

## Sammenhæng mellem eurocodes og harmoniserede tekniske specifikationer (EN'er og ETA'er) for byggevarer

Der er behov for overensstemmelse mellem de harmoniserede tekniske specifikationer for byggevarer og konstruktionsnormerne[4]. Desuden bør alle de oplysninger, der ledsager byggevarernes CE-mærkning, og som henviser til eurocodes, tydeligt angive, hvilke nationalt bestemte parametre der er anvendt.

## Nationalt anneks til EN 1993-1-8

Denne standard indeholder alternative fremgangsmåder, værdier og anbefalinger samt noter, der angiver, hvor det kan være nødvendigt at træffe nationale valg. Den nationale standard til implementering af EN 1993-1-8 bør have et nationalt anneks med alle de nationalt bestemte parametre for projektering af stålkonstruktioner til opførelse i det pågældende land.

Nationalt valg er ifølge EN 1993-1-8 tilladt i:

– 2.2(2)

– 1.2.6 (Gruppe 6: Nitter)

– 3.1.1(3)

– 3.4.2(1)

– 5.2.1(2)

– 6.2.7.2(9).

[4] Se art. 3.3 og art. 12 i byggevaredirektivet, samt pkt. 4.2, 4.3.1, 4.3.2 og 5.2 i ID 1.

## 1.1 Scope

(1) This part of EN 1993 gives design methods for the design of joints subject to predominantly static loading using steel grades S235, S275, S355 and S460.

## 1.2 Normative references

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 (including amendments).

### 1.2.1 Reference Standards, Group 1: Weldable structural steels

EN 10025-1:2004 Hot rolled products of structural steels. General technical delivery conditions

EN 10025-2:2004 Hot rolled products of structural steels. Technical delivery conditions for non-alloy structural steels

EN 10025-3:2004 Hot rolled products of structural steels. Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

EN 10025-4:2004 Hot rolled products of structural steels. Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels

EN 10025-5:2004 Hot rolled products of structural steels. Technical delivery conditions for structural steels with improved atmospheric corrosion resistance

EN 10025-6:2004 Hot rolled products of structural steels. Technical delivery conditions for flat products of high yield strength structural steels in quenched and tempered condition

### 1.2.2 Reference Standards, Group 2: Tolerances, dimensions and technical delivery conditions

EN 10029:1991 Hot rolled steel plates 3 mm thick or above - Tolerances on dimensions, shape and mass

EN 10034:1993 Structural steel I- and H-sections - Tolerances on shape and dimensions

EN 10051:1991 Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels - Tolerances on dimensions and shape

EN 10055:1995 Hot rolled steel equal flange tees with radiused root and toes - Dimensions and tolerances on shape and dimensions

EN 10056-1:1995 Structural steel equal and unequal leg angles - Part 1: Dimensions

EN 10056-2:1993 Structural steel equal and unequal leg angles - Part 2: Tolerances on shape and dimensions

EN 10164:1993 Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions

### 1.2.3 Reference Standards, Group 3: Structural hollow sections

EN 10219-1:1997 Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 1: Technical delivery requirements

# 1 Indledning

## 1.1 Emne

(1) Denne del af EN 1993 indeholder metoder til dimensionering af samlinger, der overvejende påvirkes af statisk last og er fremstillet af stålstyrkeklasse S235, S275, S355 og S460.

## 1.2 Normative referencer

Normative referencer er henvisninger til andre standarder, hvis bestemmelser i form af daterede eller udaterede referencer gælder for denne standard. Disse normative referencer er anført de relevante steder i teksten, og publikationerne er nævnt nedenfor. Når daterede referencer ændres eller revideres, vil ændringen eller revisionen ikke gælde for denne standard, medmindre der udgives et tillæg eller en revideret udgave. For udaterede referencer gælder den nyeste udgave af den pågældende publikation (med tillæg).

### 1.2.1 *Referencestandarder, Gruppe 1: Svejselige konstruktionsstål*

EN 10025-1:2004 Hot rolled products of structural steels – General technical delivery conditions

EN 10025-2:2004 Hot rolled products of structural steels – Technical delivery conditions for non-alloy structural steels

EN 10025-3:2004 Hot rolled products of structural steels – Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels

EN 10025-4:2004 Hot rolled products of structural steels – Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels

EN 10025-5:2004 Hot rolled products of structural steels – Technical delivery conditions for structural steels with improved atmospheric corrosion resistance

EN 10025-6:2004 Hot rolled products of structural steels – Technical delivery conditions for flat products of high yield strength structural steels in quenched and tempered condition.

### 1.2.2 *Referencestandarder, Gruppe 2: Tolerancer, dimensioner og tekniske leveringsbetingelser*

EN 10029:1991 Hot rolled steel plates 3 mm thick or above – Tolerances on dimensions, shape and mass

EN 10034:1993 Structural steel I- and H-sections – Tolerances on shape and dimensions

EN 10051:1991 Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels – Tolerances on dimensions and shape

EN 10055:1995 Hot rolled steel equal flange tees with radiused root and toes – Dimensions and tolerances on shape and dimensions

EN 10056-1:1995 Structural steel equal and unequal leg angles – Part 1: Dimensions

EN 10056-2:1993 Structural steel equal and unequal leg angles – Part 2: Tolerances on shape and dimensions

EN 10164:1993 Steel products with improved deformation properties perpendicular to the surface of the product – Technical delivery conditions.

### 1.2.3 *Referencestandarder, Gruppe 3: Rørprofiler*

EN 10219-1:1997 Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery requirements

| | |
|---|---|
| EN 10210-1:1994 | Hot finished structural hollow sections of non-alloy and fine grain structural steels - Part 1: Technical delivery requirements |
| EN 10210-2:1997 | Hot finished structural hollow sections of non-alloy and fine grain structural steels - Part 2: Tolerances, dimensions and sectional properties |

### 1.2.4 Reference Standards, Group 4: Bolts, nuts and washers

| | |
|---|---|
| EN 14399-1:2002 | High strength structural bolting for preloading - Part 1 : General Requirements |
| EN 14399-2:2002 | High strength structural bolting for preloading - Part 2 : Suitability Test for preloading |
| EN 14399-3:2002 | High strength structural bolting for preloading - Part 3 : System HR -Hexagon bolt and nut assemblies |
| EN 14399-4:2002 | High strength structural bolting for preloading - Part 4 : System HV -Hexagon bolt and nut assemblies |
| EN 14399-5:2002 | High strength structural bolting for preloading - Part 5 : Plain washers for system HR |
| EN 14399-6:2002 | High strength structural bolting for preloading - Part 6 : Plain chamfered washers for systems HR and HV |
| EN ISO 898-1:1999 | Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs (ISO 898-1:1999) |
| EN 20898-2:1993 | Mechanical properties of fasteners - Part 2: Nuts with special proof load values - Coarse thread (ISO 898-2:1992) |
| EN ISO 2320:1997 | Prevailing torque type steel hexagon nuts - Mechanical and performance requirements (ISO 2320:1997) |
| EN ISO 4014:2000 | Hexagon head bolts - Product grades A and B (ISO 4014:1999) |
| EN ISO 4016:2000 | Hexagon head bolts - Product grade C (ISO 4016:1999) |
| EN ISO 4017:2000 | Hexagon head screws - Product grades A and B (ISO 4017:1999) |
| EN ISO 4018:2000 | Hexagon head screws - Product grade C (ISO 4018:1999) |
| EN ISO 4032:2000 | Hexagon nuts, style 1 - Product grades A and B (ISO 4032:1999) |
| EN ISO 4033:2000 | Hexagon nuts, style 2 - Product grades A and B (ISO 4033:1999) |
| EN ISO 4034:2000 | Hexagon nuts - Product grade C (ISO 4034:1999) |
| EN ISO 7040:1997 | Prevailing torque hexagon nuts (with non-metallic insert), style 1 - Property classes 5, 8 and 10 |
| EN ISO 7042:1997 | Prevailing torque all-metal hexagon nuts, style 2 - Property classes 5, 8, 10 and 12 |
| EN ISO 7719:1997 | Prevailing torque type all-metal hexagon nuts, style 1 - Property classes 5, 8 and 10 |
| ISO 286- 2:1988 | ISO system of limits and fits - Part 2: Tables of standard tolerance grades and limit deviations for hole and shafts |
| ISO 1891:1979 | Bolts, screws, nuts and accessories - Terminology and nomenclature - Trilingual edition |
| EN ISO 7089:2000 | Plain washers- Nominal series- Product grade A |
| EN ISO 7090:2000 | Plain washers, chamfered - Normal series - Product grade A |
| EN ISO 7091:2000 | Plain washers - Normal series - Product grade C |
| EN ISO 10511:1997 | Prevailing torque type hexagon thin nuts (with non-metallic insert) |
| EN ISO 10512:1997 | Prevailing torque type hexagon nuts thin nuts, style 1, with metric fine pitch thread - Property classes 6, 8 and 10 |
| EN ISO 10513:1997 | Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread - Property classes 8, 10 and 12 |

| | |
|---|---|
| EN 10219-2:1997 | Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties |
| EN 10210-1:1994 | Hot finished structural hollow sections of non-alloy and fine grain structural steels – Part 1: Technical delivery requirements |
| EN 10210-2:1997 | Hot finished structural hollow sections of non-alloy and fine grain structural steels – Part 2: Tolerances, dimensions and sectional properties. |

**1.2.4** ***Referencestandarder, Gruppe 4: Bolte, møtrikker og underlagsskiver***

| | |
|---|---|
| EN 14399-1:2002 | High strength structural bolting for preloading – Part 1: General Requirements |
| EN 14399-2:2002 | High strength structural bolting for preloading – Part 2: Suitability Test for preloading |
| EN 14399-3:2002 | High strength structural bolting for preloading – Part 3: System HR -Hexagon bolt and nut assemblies |
| EN 14399-4:2002 | High strength structural bolting for preloading – Part 4: System HV -Hexagon bolt and nut assemblies |
| EN 14399-5:2002 | High strength structural bolting for preloading – Part 5: Plain washers for system HR |
| EN 14399-6:2002 | High strength structural bolting for preloading – Part 6: Plain chamfered washers for systems HR and HV |
| EN ISO 898-1:1999 | Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs (ISO 898-1:1999) |
| EN 20898-2:1993 | Mechanical properties of fasteners – Part 2: Nuts with special proof load values – Coarse thread (ISO 898-2:1992) |
| EN ISO 2320:1997 | Prevailing torque type steel hexagon nuts – Mechanical and performance requirements (ISO 2320:1997) |
| EN ISO 4014:2000 | Hexagon head bolts – Product grades A and B (ISO 4014:1999) |
| EN ISO 4016:2000 | Hexagon head bolts – Product grade C (ISO 4016:1999) |
| EN ISO 4017:2000 | Hexagon head screws – Product grades A and B (ISO 4017:1999) |
| EN ISO 4018:2000 | Hexagon head screws – Product grade C (ISO 4018:1999) |
| EN ISO 4032:2000 | Hexagon nuts, style 1 – Product grades A and B (ISO 4032:1999) |
| EN ISO 4033:2000 | Hexagon nuts, style 2 – Product grades A and B (ISO 4033:1999) |
| EN ISO 4034:2000 | Hexagon nuts – Product grade C (ISO 4034:1999) |
| EN ISO 7040:1997 | Prevailing torque hexagon nuts (with non-metallic insert), style 1 – Property classes 5, 8 and 10 |
| EN ISO 7042:1997 | Prevailing torque all-metal hexagon nuts, style 2 – Property classes 5, 8, 10 and 12 |
| EN ISO 7719:1997 | Prevailing torque type all-metal hexagon nuts, style 1 – Property classes 5, 8 and 10 |
| ISO 286- 2:1988 | ISO system of limits and fits – Part 2: Tables of standard tolerance grades and limit deviations for hole and shafts |
| ISO 1891:1979 | Bolts, screws, nuts and accessories – Terminology and nomenclature – Trilingual edition |
| EN ISO 7089:2000 | Plain washers- Nominal series- Product grade A |
| EN ISO 7090:2000 | Plain washers, chamfered – Normal series – Product grade A |
| EN ISO 7091:2000 | Plain washers – Normal series – Product grade C |
| EN ISO 10511:1997 | Prevailing torque type hexagon thin nuts (with non-metallic insert) |
| EN ISO 10512:1997 | Prevailing torque type hexagon nuts thin nuts, style 1, with metric fine pitch thread – Property classes 6, 8 and 10 |
| EN ISO 10513:1997 | Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread – Property classes 8, 10 and 12. |

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|---|---|
| EN 12345:1998 | Welding-Multilingual terms for welded joints with illustrations. September 1998. |
| EN ISO 14555:1998 | Welding-Arc stud welding of metallic materials. May 1995 |
| EN ISO 13918:1998 | Welding-Studs for arc stud welding-January 1997 |
| EN 288-3:1992 | Specification and approval of welding procedures for metallic materials. Part 3: Welding procedure tests for arc welding of steels. 1992 |
| EN ISO 5817:2003 | Arc-welded joints in steel - Guidance for quality levels for imperfections |

### 1.2.6 Reference Standards, Group 6: Rivets

**NOTE:** Information may be given in the National Annex.

### 1.2.7 Reference Standard, Group 7: Execution of steel structures

| | |
|---|---|
| EN 1090-2 | Requirements for the execution of steel structures |

## 1.3 Distinction between Principles and Application Rules

(1) The rules in EN 1990 clause 1.4 apply.

## 1.4 Terms and definitions

(1) The following terms and definitions apply:

**1.4.1**
**basic component** (of a joint)
Part of a joint that makes a contribution to one or more of its structural properties.

**1.4.2**
**connection**
Location at which two or more elements meet. For design purposes it is the assembly of the basic components required to represent the behaviour during the transfer of the relevant internal forces and moments at the connection.

**1.4.3**
**connected member**
Any member that is joined to a supporting member or element.

**1.4.4**
**joint**
Zone where two or more members are interconnected. For design purposes it is the assembly of all the basic components required to represent the behaviour during the transfer of the relevant internal forces and moments between the connected members. A beam-to-column joint consists of a web panel and either one connection (single sided joint configuration) or two connections (double sided joint configuration), see Figure 1.1.

**1.4.5**
**joint configuration**
Type or layout of the joint or joints in a zone within which the axes of two or more inter-connected members intersect, see Figure 1.2.

#### 1.2.5 *Referencestandarder, Gruppe 5: Svejsematerialer og svejsning*

| | |
|---|---|
| EN 12345:1998 | Welding-Multilingual terms for welded joints with illustrations. September 1998. |
| EN ISO 14555:1998 | Welding-Arc stud welding of metallic materials. May 1995 |
| EN ISO 13918:1998 | Welding-Studs for arc stud welding-January 1997 |
| EN 288-3:1992 | Specification and approval of welding procedures for metallic materials. Part 3: Welding procedure tests for arc welding of steels. 1992 |
| EN ISO 5817:2003 | Arc-welded joints in steel – Guidance for quality levels for imperfections. |

#### 1.2.6 *Referencestandarder, Gruppe 6: Nitter*

NOTE – Oplysninger kan anføres i det nationale anneks.

#### 1.2.7 *Referencestandard, Gruppe 7: Udførelse af stålkonstruktioner*

| | |
|---|---|
| EN 1090-2 | Requirements for the execution of steel structures. |

### 1.3 Forskellen mellem principper og anvendelsesregler

(1) Reglerne i EN 1990, punkt 1.4, gælder.

### 1.4 Begreber og definitioner

(1) Følgende termer og definitioner gælder:

**1.4.1**
***grundkomponent (i en samling)***
Del af en samling, der bidrager til en eller flere af de bærende egenskaber.

**1.4.2**
***samling***
Sted, hvor to eller flere bygningsdele samles. I dimensioneringssammenhæng er en samling den sammenføjning af grundkomponenterne, der er nødvendig for at afspejle virkemåden ved overførsel af de relevante snitkræfter ved samlingen.

**1.4.3**
***tilsluttet element***
Ethvert element, der er forbundet med et understøttende element eller en understøttende konstruktionsdel.

**1.4.4**
***samling***
Område, hvor to eller flere elementer er forbundet med hinanden. I dimensioneringssammenhæng er det den sammenføjning af alle grundkomponenter, der kræves for at repræsentere virkemåden ved overførsel af snitkræfter mellem de tilsluttede elementer. En bjælke-søjle-samling består af en kropplade og enten én samling (ensidig samling) eller to samlinger (dobbeltsidig samling), se figur 1.1.

**1.4.5**
***samlingskonfiguration***
Type eller udformning af samlingen eller samlingerne i et område, hvori to eller flere indbyrdes tilsluttede elementers akser skærer hinanden, se figur 1.2.