

Eurocode 3: Design of steel structures —

Part 1-8: Design of joints

ICS 91.010.30; 91.080.10

National foreword

This British Standard is the UK implementation of EN 1993-1-8:2005, incorporating corrigenda December 2005 and July 2009. It supersedes DD ENV 1993-1-1:1992, which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN corrigendum. For example, text altered by December 2005 corrigendum is indicated by **AC1** ~~AC1~~.

The structural Eurocodes are divided into packages by grouping Eurocodes for each of the main materials: concrete, steel, composite concrete and steel, timber, masonry and aluminium; this is to enable a common date of withdrawal (DOW) for all the relevant parts that are needed for a particular design. The conflicting national standards will be withdrawn at the end of the co-existence period, after all the EN Eurocodes of a package are available.

Following publication of the EN, there is a period allowed for national calibration during which the National Annex is issued, followed by a co-existence period of a maximum three years. During the co-existence period Member States are encouraged to adapt their national provisions. At the end of this co-existence period, the conflicting parts of national standard(s) will be withdrawn.

In the UK, the primary corresponding national standards are:

BS 449-2:1969, *Specification for the use of structural steel in building. Metric units*

BS 4604-1:1970, *Specification for the use of high strength friction grip bolts in structural steelwork. Metric series. General grade*

BS 4604-2:1970, *Specification for the use of high strength friction grip bolts in structural steelwork. Metric series. Higher grade (parallel shank)*

BS 5400-3:2000, *Steel, concrete and composite bridges. Code of practice for design of steel bridges*

BS 5950-1:2000, *Structural use of steelwork in building. Code of practice for design. Rolled and welded sections*

BS EN 1993-1-1 partially supersedes BS 449-2, BS 4604-1, BS 4604-2, BS 5400-3, and BS 5950-1, which will be withdrawn by March 2010.

The UK participation in its preparation was entrusted by Technical Committee B/525, *Building and civil engineering structures*, to Subcommittee B/525/31, *Structural use of steel*.

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
16291 Corrigendum No. 1	June 2006	Implementation of CEN corrigendum December 2005
16571 Corrigendum No. 2	September 2006	Revision of national foreword and supersession details
	28 February 2010	Implementation of CEN corrigendum July 2009
	31 August 2010	Correction to 'brace failure' equation on Table 7.14

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A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Where a normative part of this EN allows for a choice to be made at the national level, the range and possible choice will be given in the normative text as Recommended Values, and a note will qualify it as a Nationally Determined Parameter (NDP). NDPs can be a specific value for a factor, a specific level or class, a particular method or a particular application rule if several are proposed in the EN.

To enable EN 1993-1-8 to be used in the UK, the NDPs have been published in a National Annex, which has been issued separately by BSI.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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.



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Contents	Page
1 Introduction	8
1.1 Scope	8
1.2 Normative references.....	8
1.3 Distinction between Principles and Application Rules	10
1.4 Terms and definitions	10
1.5 Symbols	13
2 Basis of design	18
2.1 Assumptions	18
2.2 General requirements.....	18
2.3 Applied forces and moments	18
2.4 Resistance of joints.....	18
2.5 Design assumptions	19
2.6 Joints loaded in shear subject to impact, vibration and/or load reversal	19
2.7 Eccentricity at intersections.....	19
3 Connections made with bolts, rivets or pins.....	20
3.1 Bolts, nuts and washers	20
3.1.1 General	20
3.1.2 Preloaded bolts	20
3.2 Rivets.....	20
3.3 Anchor bolts	21
3.4 Categories of bolted connections.....	21
3.4.1 Shear connections.....	21
3.4.2 Tension connections	21
3.5 Positioning of holes for bolts and rivets	23
3.6 Design resistance of individual fasteners	24
3.6.1 Bolts and rivets	24
3.6.2 Injection bolts	28
3.7 Group of fasteners	29
3.8 Long joints.....	29
3.9 Slip-resistant connections using 8.8 or 10.9 bolts	30
3.9.1 Design Slip resistance.....	30
3.9.2 Combined tension and shear.....	31
3.9.3 Hybrid connections.....	31
3.10 Deductions for fastener holes	31
3.10.1 General	31
3.10.2 Design for block tearing	32
3.10.3 Angles connected by one leg and other unsymmetrically connected members in tension	33
3.10.4 Lug angles	34
3.11 Prying forces.....	34
3.12 Distribution of forces between fasteners at the ultimate limit state.....	34
3.13 Connections made with pins.....	35
3.13.1 General	35
3.13.2 Design of pins.....	35
4 Welded connections	38
4.1 General	38
4.2 Welding consumables.....	38
4.3 Geometry and dimensions	38
4.3.1 Type of weld.....	38
4.3.2 Fillet welds	38
4.3.3 Fillet welds all round	40
4.3.4 Butt welds.....	40
4.3.5 Plug welds	41

4.3.6	Flare groove welds.....	41
4.4	Welds with packings.....	41
4.5	Design resistance of a fillet weld.....	42
4.5.1	Length of welds	42
4.5.2	Effective throat thickness	42
4.5.3	Design Resistance of fillet welds.....	42
4.6	Design resistance of fillet welds all round.....	44
4.7	Design resistance of butt welds	45
4.7.1	Full penetration butt welds	45
4.7.2	Partial penetration butt welds	45
4.7.3	T-butt joints	45
4.8	Design resistance of plug welds	45
4.9	Distribution of forces.....	46
4.10	Connections to unstiffened flanges.....	46
4.11	Long joints.....	48
4.12	Eccentrically loaded single fillet or single-sided partial penetration butt welds	48
4.13	Angles connected by one leg.....	48
4.14	Welding in cold-formed zones	49
5	Analysis, classification and modelling	50
5.1	Global analysis	50
5.1.1	General	50
5.1.2	Elastic global analysis	50
5.1.3	Rigid-plastic global analysis.....	51
5.1.4	Elastic- plastic global analysis.....	51
5.1.5	Global analysis of lattice girders	52
5.2	Classification of joints	54
5.2.1	General	54
5.2.2	Classification by stiffness.....	54
5.2.3	Classification by strength	55
5.3	Modelling of beam-to-column joints.....	56
6	Structural joints connecting H or I sections.....	60
6.1	General	60
6.1.1	Basis	60
6.1.2	Structural properties	60
6.1.3	Basic components of a joint.....	61
6.2	Design Resistance.....	65
6.2.1	Internal forces.....	65
6.2.2	Shear forces	65
6.2.3	Bending moments.....	66
6.2.4	Equivalent T-stub in tension.....	67
6.2.5	Equivalent T-stub in compression	70
6.2.6	Design Resistance of basic components	71
6.2.7	Design moment resistance of beam-to-column joints and splices.....	84
6.2.8	Design resistance of column bases with base plates.....	89
6.3	Rotational stiffness	92
6.3.1	Basic model	92
6.3.2	Stiffness coefficients for basic joint components	94
6.3.3	End-plate joints with two or more bolt-rows in tension	97
6.3.4	Column bases.....	98
6.4	Rotation capacity	99
6.4.1	General	99
6.4.2	Bolted joints.....	100
6.4.3	Welded Joints	100
7	Hollow section joints.....	101
7.1	General	101

BS EN 1993-1-8:2005
EN 1993-1-8:2005 (E)

7.1.1	Scope	101
7.1.2	Field of application.....	101
7.2	Design.....	103
7.2.1	General	103
7.2.2	Failure modes for hollow section joints.....	103
7.3	Welds.....	107
7.3.1	Design resistance	107
7.4	Welded joints between CHS members	108
7.4.1	General	108
7.4.2	Uniplanar joints	108
7.4.3	Multiplanar joints	115
7.5	Welded joints between CHS or RHS brace members and RHS chord members	116
7.5.1	General	116
7.5.2	Uniplanar joints	117
7.5.3	Multiplanar joints	128
7.6	Welded joints between CHS or RHS brace members and I or H section chords	129
7.7	Welded joints between CHS or RHS brace members and channel section chord members	132

Foreword

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 agreement¹ 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).

Eurocode standards recognize the responsibility of regulatory authorities in each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level where these continue 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 Documents² referred to in Article 12 of the CPD, although they are of a different nature from harmonized product standards³. 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.

Links between Eurocodes and harmonized technical specifications (ENs and ETAs) for products

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 ETAs/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.