BS EN 1993-4-3:2007

Incorporating corrigendum July 2009

Eurocode 3 — Design of steel structures —

Part 4-3: Pipelines

 $ICS\ 23.040.01;\ 91.010.30;\ 91.080.10$



National foreword

This British Standard is the UK implementation of EN 1993-4-3:2007, incorporating corrigendum July 2009.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by CEN corrigendum July 2009 is indicated in the text by $\boxed{\text{ACI}}$ $\boxed{\text{ACI}}$.

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 The conflicting national standards will be withdrawn at the end of the co-existence period, after all the EN Eurocodes of a package are available.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 At the end of this co-existence period, the conflicting parts of national standard(s) will be withdrawn.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 there are no conflicting national standards.

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*.

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.

UK National Annex to BS EN 1993-4-3

To enable EN 1993-4-3 to be used in the UK, the committee has decided that no National Annex will be issued and recommend the following:

- all the Recommended Values should be used;
- all Informative Annexes may be used; and
- no NCCI have currently been identified.

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 obligation

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2007

© BSI 2010

Amendments/corrigenda issued since publication

Date	Comments
28 February 2010	Implementation of CEN corrigendum July 2009, and correction to national foreword

ISBN 978 0 580 66471 7

EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 1993-4-3

February 2007

ICS 23.040.01; 91.010.30; 91.080.10

Supersedes ENV 1993-4-3:1999

English Version

Eurocode 3 - Design of steel structures - Part 4-3: Pipelines

Eurocode 3 - Calcul des constructions en acier - Partie 4-3: Tuyauterie Eurocode 3 - Bemessung und Konstruktion von Stahlbauten - Teil 4-3: Rohrleitungen

This European Standard was approved by CEN on 12 June 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.



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

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

© 2007 CEN

All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 1993-4-3:2007: E

This is a preview. Click here to purchase the full publication.

BS EN 1993-4-3:2007 EN 1993-4-3: 2007 (E)

C	O	n	t	е	n	t
v	v		U	J		u

		eword kground of the Eurocode programme	3
Sta	Nat Lin Add	Ild of application of Eurocodes ional Standards implementing Eurocodes ks between Eurocodes and harmonised technical specifications (ENs and ETAs) litional information specific to EN 1993-4-3 ional Annex for EN 1993-4-3	4 4 5 5 5
1	1.3 1.4 1.5 1.6	Normative references Assumptions Distinction between principles and application rules Definitions S.I. units Symbols used in Part 4-3 of Eurocode 3	7 7 8 9 9 10 10
2	2.2 2.3 2.4 2.5	General Fundamental requirements for pipelines Reliability differentiation Methods of analysis Ultimate limit states Serviceability limit states	13 13 13 14 14 15
3	3.1 3.2 3.3 3.4	General Mechanical properties of pipeline steels Mechanical properties of welds Toughness requirements of plate materials and welds Fasteners Soil properties	16 16 16 17 17
	4.2 4.3 4.4 Analysis 5.1		18 18 18 19 20 20
6	5.3	Ultimate limit state verification Serviceability limit state verifications design aspects of fabrication and erection	23 25 25
Aı	pip A.1 A.2	nformative] - Analysis of resistances, deformations, stresses and strains of buried relines Procedure and scope of analysis Analysis for straight pipes Analysis for bends	26 26 26 33
Aı	nnex B: [ir	formative] - Bibliography to National Standards and design guides	34
Aı	C.1	General bibliography on pipelines Bibliography on geotechnical engineering	35 35 39

BS EN 1993-4-3:2007 EN 1993-4-3: 2007 (E)

Foreword

This European Standard EN 1993-4-3, "Eurocode 3: Design of steel structures – Part 4.3: Pipelines", 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.

This document supersedes ENV 1993-4-3:1999.

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.

Background of 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 harmonisation of technical specifications.

Within this action programme, the Commission took the initiative to establish a set of harmonised 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 1980's.

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 the 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:

EN1990 Eurocode 0: Basis of structural design

EN1991 Eurocode 1: Actions on structures

EN1992 Eurocode 2: Design of concrete structures

EN1993 Eurocode 3: Design of steel structures

EN1994 Eurocode 4: Design of composite steel and concrete 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).