

Eurocode 6: Design of masonry structures —

Part 1.3: General rules for building — Detailed rules on lateral loading

**(together with United Kingdom
National Application Document)**

ICS 91.010.30; 91.080.30

Committees responsible for this Draft for Development

The preparation of this Draft for Development was entrusted by Technical Committee B/525, Building and civil engineering structures, to Subcommittee B/525/6, Use of masonry, upon which the following bodies were represented:

Association of Consulting Engineers
Autoclaved Aerated Concrete Products Association
Brick Development Association
British Ceramic Research Ltd.
British Masonry Society
British Precast Concrete Federation Ltd.
Construction Federation
Concrete Block Association
Department of the Environment, Transport and the Regions —
represented by the Building Research Establishment
Department of the Environment, Transport and the Regions —
Construction Research Directorate
Institution of Civil Engineers
Institution of Structural Engineers
National House Building Council
Royal Institute of British Architects

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Amendments issued since publication

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National foreword

This Draft for Development was prepared by Subcommittee B/525/6, and is the English language version of ENV 1996-1-3:1998 *Eurocode 6: Design of masonry structures — Part 1-3: General rules for building — Detailed rules on lateral loading*, published by the European Committee for Standardization (CEN). This Draft for Development also includes the United Kingdom (UK) National Application Document (NAD) to be used with the ENV for the design of masonry structures to be constructed in the UK.

ENV 1996-1-3:1998 results from a programme of work sponsored by the European Commission to make available a common set of rules for the design of building and civil engineering works.

This publication is not to be regarded as a British Standard.

An ENV is made available for provisional application during a trial period of use of three years, but does not have the status of a European Standard. The aim is to use the experience gained to modify the ENV so that it can be adopted as a European Standard. The publication of this ENV and its NAD should be considered to supersede any reference to a British Standard in previous DD ENV Eurocodes concerning the subject covered by these documents.

The values for certain parameters in the ENV Eurocodes may be set by individual CEN Members so as to meet the requirements of national regulations. These parameters are designated by □ (boxed values) in the ENV.

During the ENV period of validity, reference should be made to the supporting documents listed in the NAD. The purpose of the NAD is to provide essential information, particularly in relation to safety, to enable the ENV to be used for structures constructed in the UK and the NAD takes precedence over corresponding provisions in the ENV.

Approved Document A to The Building Regulations 1991 [1], draws designers' attention to the potential use of ENV Eurocodes as an alternative approach to Building Regulation compliance. ENV 1996-1-3 has been thoroughly examined over a period of several years and is considered to offer such an alternative approach, when used in conjunction with this NAD.

The recommendations of DD ENV 1996-1-3 apply pending the publication of ENV 1996-2.

Compliance with ENV 1996-1-3:1998 and this NAD does not in itself confer immunity from legal obligations.

Users of this document are invited to comment on its technical content, ease of use and any ambiguities or anomalies. These comments will be taken into account when preparing the UK national response to CEN to the question of whether the ENV can be converted to an EN.

Comments should be sent in writing to BSI, British Standards House, 389 Chiswick High Road, London W4 4AL, quoting the document reference, the relevant clause and, where possible, a proposed revision.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to viii, the ENV title page, pages 2 to 23 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

National Application Document

**for use in the UK with
ENV 1996-1-3:1998**

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Introduction

This National Application Document (NAD) has been prepared by Subcommittee B/525/6, Use of masonry. It has been developed from a textual examination of ENV 1996-1-3:1998.

It should be noted that this NAD, in common with ENV 1996-1-1 and supporting European Standards, uses a comma (,) where a decimal point (.) would be traditionally used in the UK.

1 Scope

This NAD provides information to enable ENV 1996-1-3:1998 to be used for the design of buildings and civil engineering works to be constructed in the UK.

2 Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this NAD. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

BS 648:1964, *Schedule of weights of building materials*.

BS 5628-1:1992, *Code of practice for use of masonry — Part 1: Structural use of unreinforced masonry*.

BS 6399-1:1996, *Loading for buildings — Part 1: Code of practice for dead and imposed loads*.

BS 6399-2:1997, *Loading for buildings — Part 2: Code of practice for wind loads*.

BS 6399-3:1998, *Loading for buildings — Part 3: Code of practice for imposed roof loads*.

CP 3:1972, *Code of basic data for the design of buildings — Chapter V: Loading — Part 2: Wind loads*.

DD ENV 1996-1-1:1996, *Eurocode 6 — Design of masonry structures — Part 1-1: General rules for buildings — Rules for reinforced and unreinforced masonry (together with United Kingdom National Application Document)*.

3 Partial safety factors, combination factors and other boxed values

The values for partial safety factors (γ factors) should be relevant values chosen from those given in Table 1 of the NAD to ENV 1996-1-1:1995.

The values for combination factors (ψ factors) should be relevant values chosen from those given in Table 2 of the NAD to ENV 1996-1-1:1995.

The values for other boxed values should be relevant values chosen from those given in Table 3 of the NAD to ENV 1996-1-1:1995 except that the minimum thickness of the wall or one leaf of a cavity wall in A.1 (3) should be 75 mm.

4 Loading codes

The loading codes given in BS 648, BS 6399-1, -2 and -3 and CP 3:1972, Chapter V-2 should be used.

When using these documents with ENV 1996-1-3 the following modifications should be noted.

- a) Loads from separate sources acting on a member or a component should be considered as separate actions.
- b) The design loading on a particular member or component may include the relevant load combination factors described in 2.3.2.2 and 2.3.4 of ENV 1996-1-1:1995. Alternatively for the ultimate limit state the simplification of design load given in 2.3.3.1 (3) of ENV 1996-1-1:1995 may be used.
- c) The imposed floor loads of a building should be treated as one variable action to which the reduction factors given in BS 6399-1:1984 are applicable.

5 Reference documents and standards

Where reference is made in ENV 1996-1-3 to national regulations, such references refer to Building and Buildings [1] in England and Wales, to Building and Buildings [2] in Scotland and to Building Regulations [3] in Northern Ireland.

The supporting standards to be used, including materials specifications and standards for construction should be those given in Table 4 of the NAD to ENV 1996-1-1:1995.

6 Additional recommendations

6.1 Subclause 1.4: Symbols

The symbols f_k , h , q_{lat} , Z and α in ENV 1996-1-3:1998 may be taken as equivalent to the symbols f_k , h , q_{lat} , Z and α , respectively, in BS 5628-1:1992.

The symbols L , t and W_k in ENV 1996-1-3:1998 have the same engineering meaning as the symbols L , t and W_k , respectively, in BS 5628-1:1992 but, for the purposes of this NAD, the definitions in BS 5628-1:1992 should be used.

The term f_{xk} in ENV 1996-1-3:1998 should be taken to be equivalent to the term f_{kx} in BS 5628-1:1992.

The terms f_{xk1} and f_{xk2} in ENV 1996-1-3:1998 should be taken to be equivalent, respectively, to f_{kx} with the plane of failure parallel to the bed joints and f_{kx} with the plane of failure perpendicular to the bed joints in BS 5628-1:1992.

The term n_a in ENV 1996-1-3:1998 should be taken to be equivalent to the term n in BS 5628-1:1992.

The terms d , f_{xd} , M_d , M_{rd} and σ_{dp} in ENV 1996-1-3:1998 have no equivalent in BS 5628-1:1992 and the definitions should be as given in ENV 1996-1-3:1998.

6.2 Section 3: Materials

a) Subclause 3.1

The materials used in masonry walls subject to lateral loading shall be in accordance with **6.3** of the NAD to ENV 1996-1-1:1995.

b) Subclause 3.2

The characteristic flexural strength of unreinforced masonry, f_{xk} , should either be determined in accordance with **3.6.4** of ENV 1996-1-1:1995 or may be derived from Table 3 of BS 5628-1:1992.

c) Subclause 3.3

The design flexural strength of masonry should be calculated using the formula given in **3.3** of ENV 1996-1-3:1998 taking into account the equivalence of the terms f_{xk} in ENV 1996-1-3:1998 and f_{kx} in BS 5628-1:1992, and using the values of f_{xk} taken from BS 5628-1:1992.

6.3 Section 4: Design of masonry subjected to lateral loads

a) Subclause 4.1.4

The design should be to the formulae given in **4.1.4** of ENV 1996-1-3:1998 taking into account the equivalence of the terms in ENV 1996-1-3:1998 and in BS 5628-1:1992, and using the values of f_{xk} and f_{xk1} taken from BS 5628-1:1992.

b) Subclause 4.2.2

The formula from **36.8** of BS 5628-1:1992 should be substituted for the formula numbered (4.9) in **4.2.2** of ENV 1996-1-3:1998.

6.4 Section 5: Structural detailing

Pending publication of ENV 1996-2 structural detailing of masonry walls subjected to lateral loading should be in accordance with **6.5** of the NAD to ENV 1996-1-1:1995.

6.5 Section 6: Construction

Pending publication of ENV 1996-2 construction of masonry walls subjected to lateral loading should be in accordance with **6.6** of the NAD to ENV 1996-1-1:1995.

Bibliography

- [1] GREAT BRITAIN. The Building Regulations 1991. SI 1991 No. 2768. London, HMSO.
- [2] GREAT BRITAIN. The Building Standards (Scotland) Regulations 1990. SI 1990 No. 2179 (S.187). London, HMSO.
- [3] GREAT BRITAIN. The Building Regulations (Northern Ireland) 1990. SRNI 1990 No. 59. London, HMSO.

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English version

Eurocode 6: Design of masonry structures - Part 1-3: General rules for buildings - Detailed rules on lateral loading

Eurocode 6: Calcul des ouvrages en maçonnerie - Partie 1-3: Règles générales - Règles particulières pour les charges latérales

Eurocode 6: Bemessung und Konstruktion von Mauerwerksbauten Teil 1-3: Allgemeine Regeln - Detaillierte Regeln bei horizontaler Belastung

This European Prestandard (ENV) was approved by CEN on 26 March 1998 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Central Secretariat: rue de Stassart, 36 B-1050 Brussels