

Eurocode 2: Design of concrete structures —

**Part 1.4 General rules —
Lightweight aggregate concrete with
closed structure —**

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

ICS 91.040; 91.080.40

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Committees responsible for this Draft for Development

The preparation of this Draft for Development was entrusted by Technical Committee B/525, to Subcommittee B/525/2, Structural use of concrete, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Cement Association
- British Precast Concrete Federation Ltd.
- Department of the Environment (Property and Buildings Directorate)
- Department of Transport (Highways Agency)
- Federation of Civil Engineering Contractors
- Institution of Civil Engineers
- Institution of Structural Engineers
- Steel Reinforcement Commission

This Draft for Development, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 September 1996

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National foreword

This Draft for Development was prepared by Subcommittee B/525/2 and is the English language version of ENV 1992-1-4:1994 *Eurocode 2: Design of concrete structures Part 1.4: General rules — Lightweight aggregate concrete with closed structure*, as 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 in the design of buildings to be constructed in the UK.

ENV 1992-1-4 results from a programme of work sponsored by the European commission to make available a common set of rules for the structural and geotechnical 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, 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 National Application Document 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 |_| in the ENV.

During the ENV period of validity, reference should be made to the supporting documents listed in the National Application Document (NAD).

The purpose of the NAD is to provide essential information, particularly in relation to safety, to enable the ENV to be used for buildings constructed in the UK. The NAD takes precedence over corresponding provisions in the ENV.

The Building Regulations 1991, Approved Document A 1992, draws attention to the potential use of ENV Eurocodes as an alternative approach to Building Regulation compliance. ENV 1992-1-4 is considered to offer such an alternative approach, when used in conjunction with its NAD.

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 on the question of whether the ENV can be converted to an EN.

Comments should be sent in writing to the Secretary of Subcommittee B/525/2, BSI, 389 Chiswick High Road, London W4 4AL, quoting the document reference, the relevant clause and, where possible, a proposed revision, by 31 October 1996.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, the ENV title page, pages 2 to 17 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

National Application Document for use in the UK with ENV 1992-1-4:1994

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Introduction

This National Application Document (NAD) has been prepared by Subcommittee B/525/2. It has been developed from the following.

- a) A textual examination of ENV 1992-1-4.
- b) A parametric calibration against BS 8110, supporting standards and test data.
- c) Trial calculations.

1 Scope

This NAD provides information to enable ENV 1992-1-4 (hereafter referred to as EC2-1.4) to be used for the design of buildings to be constructed in the UK. It will be assumed that it will be used in conjunction with DD ENV 1992-1-1, the NAD of which refers to BSI publications for values of actions.

2 Partial factors, combination factors and other values

- a) The values for combination coefficients (ψ) should be those given in Table 1 of the NAD for EC2-1.1.
- b) The values for partial factors for normal temperature design should be those given in EC2-1.1, except where modified by the NAD for that code.
- c) Other values should be those given in EC2-1.1, except where modified by the NAD for that code, and EC2-1.4, except for those given in Table 1 of this NAD.

Table 1 — Values to be used in referenced clauses instead of boxed values

Reference in EC2-1.4	Definition	UK values
4.4.3.2 (106)	Basic ratios of span/effective depth	0.85 times Table 7 of the NAD to EC2-1.1:1991. [Note the value 38 in Table 7 should be 47]
5.2.1.2 (104)	Minimum diameters of mandrel	0 % not 30 %, but use Table 8 of the NAD to EC2-1.1:1991

3 Reference standards

Supporting standards including materials specifications and standards for construction are listed in Table 2 of this NAD.

Table 2 — Reference in EC2-1.4 to other codes and standards

Reference in EC2-1.4	Document referred to	Document title or subject area	Status	UK document
Various	ENV 1992-1-1	Design of concrete	Published	DD ENV 1992-1-1
1.1.2 P (106)	ENV 206	Concrete: Performance, production, placing and compliance	Published 1990	DD ENV 206:1992
1.1.2 P (106)	ENV 1992-1-6	Plain concrete structures	Published 1994	DD ENV 1992-1-6:1996
1.4.2 P (103)	ENV 206	Concrete: Performance, production, placing and compliance	Published 1990	DD ENV 206:1992
2.5.5.1 (113)	ENV 1992-1-1 Appendix 1	Effects of time-dependent deformation of concrete	Published 1990	DD ENV 1992-1-1:1992
3.1.2.1 P (102)	ENV 206	Concrete: Performance, production, placing and compliance	Published 1990	DD ENV 206:1992
3.1.2.1 (103)	ENV 206	Concrete: Performance, production, placing and compliance	Published 1990	DD ENV 206:1992
3.1.2.5.2 (105)	ISO 6784	Concrete — Determination of static modulus of elasticity in compression	Published 1982	—
3.1.2.5.5 (107)	ENV 1992-1-1 Appendix 1	Effects of time-dependent deformation of concrete	Published 1990	DD ENV 1992-1-1:1992
4.2.1.3.3 (103)	ENV 1992-1-1 Appendix 2 & 3	Non-linear analysis and supplementary information on the ultimate limit state induced by structural deformations	Published 1990	DD ENV 1992-1-1:1992
4.2.1.3.3 (104)	ENV 1992-1-1 Appendix 3	Supplementary information on the ultimate limit state induced by structural deformations	Published 1990	DD ENV 1992-1-1:1992
4.3.5.2 P (106)	ENV 1992-1-1 Appendix 3	Supplementary information on the ultimate limit state induced by structural deformations	Published 1990	DD ENV 1992-1-1:1992

4 Additional recommendations

4.1 Chapter 3. Material Properties

a) Clause 3.1.2.3 (105)

Equation (3.106) should be replaced by:

$$\eta_1 = 0.4 + 0.6\rho/2400$$

b) Clause 3.1.2.5.2 (105)

Equation (3.107) should be replaced by:

$$\eta_E = (\rho/2400)^2$$