National Standards Authority of Ireland

IRISH STANDARD

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EUROCODE 1: BASIS OF DESIGN AND ACTIONS ON STRUCTURES - PART 2-5: ACTIONS ON STRUCTURES - THERMAL ACTIONS

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ENV 1991-2-5

EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

English version

Eurocode 1 - Basis of design and actions on structures
Part 2.5 : Thermal actions

Eurocode 1 - Bases de calcul et actions sur les structures - Partie 2-5 :

Eurocode 1 - Grundlagen der Tragwerksplanung und Einwirkungen auf Tragwerke - Teil 2-5 :

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Contents

Foreword

Objectives of the Eurocodes

(1) The "Structural Eurocodes" comprise a group of standard for the structural and geotechnical design of buildings and civil engineering works.

(2) They cover execution and control only to the extent that is necessary to indicate the quality of the construction products, and the standard of the workmanship, needed to comply with the assumptions of the design rules.

(3) Until the necessary set of harmonized technical specification for products and for methods of testing their performance are available, some of the Structural Eurocodes cover some of these aspects in informative Annexes.

Background to the Eurocode Programme

(4) The Commission of the European Communities (CEC) initiated the work of establishing a set of harmonized technical rules for the design of building and civil engineering works which would initially serve as an alternative to the different rules in force in the various Member States and would ultimately replace them. These technical rules became known as the "Structural Eurocodes".

(5) In 1990, after consulting their respective Member States, the CEC transferred the work of further development, issue and updating of the Structural Eurocodes to CEN, and the EFTA Secretariat agreed to support the CEN work.

(6) CEN Technical Committee CEN/TC 250 is responsible for all Structural Eurocodes.

Eurocode Programme

(7) Work is in hand on the following Structural Eurocodes, each generally consisting of a number of parts:

EN 1991	Eurocode 1	Basis of design and 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 alloy structures

(8) Separate sub-committees have been formed by CEN/TC250 for the various Eurocodes listed above.

(9) This part of Eurocode 1 is being published by CEN as a European Prestandard (ENV) with an initial life of three years.

(10) This Prestandard is intended for experimental application and for the submission of comments.

(11) After approximately two years CEN members will be invited to submit formal comments to be taken into account in determining future actions.

(12) Meanwhile feedback and comments on this Prestandard should be sent to the Secretariat of CEN/TC250/SC1 at the following address:

SIS/BST
Box 490 44
S-100 28 Stockholm
SWEDEN

or to your national standards organisation.

National Application Documents (NADs)

(13) In view of the responsibilities of authorities in member countries for safety, health and other matters covered by the essential requirements of the Construction Products Directive (CPD), certain safety elements in this ENV have been assigned indicative values which are identified by [ ] or [ ] ("boxed values"). The authorities in each member country are expected to review the "boxed values" and may substitute alternative definitive values for these safety elements for use in national application.

(14) Some of the supporting European or International standards may not be available by the time this Prestandard is issued. It is therefore anticipated that a National Application Document (NAD) giving any substitute definitive values for safety elements, referencing compatible supporting standards and providing guidance on the national application of this Prestandard, will be issued by each member country or its Standards Organisation.

(15) It is intended that this Prestandard is used in conjunction with the NAD valid in the country where the building or civil engineering works is located.

Matters Specific to this Prestandard

(16) The scope of Eurocode 1 is defined in 1.1.1 and the scope of this Part of Eurocode 1 is defined in 1.1.2. Additional parts of Eurocode 1 which are planned are indicated in 1.1.3.

(17) This Part is complemented by a number of annexes, some normative and some informative. The normative annexes have the same status as the sections to which they relate.

(18) The characteristic value of isotherms of National minimum and maximum shade air temperatures shall be provided in the form of maps or otherwise (see Annex A) by the competent authority. The value provided for characteristic loads shall conform with the definitions given in ENV 1991-1 Clause 4.2.

(19) Allowance shall be made in the NAD for local effects which are unlikely to have been considered in the statistical analysis for national loads.

(20) Where there is doubt about the validity of the recommended minimum and maximum shade air temperatures, the procedure to consult the competent authority should be given in the NAD.

Section 1 General

1.1 Scope

1.1.1 Scope of ENV 1991 – Eurocode 1

(1)P ENV 1991 provides general principles and actions for the structural design of buildings and civil engineering works including some geotechnical aspects and shall be used in conjunction with ENV 1992-1999.

(2) It may also be used as a basis for the design of structures not covered in ENV 1992-1999 and where other materials or other structural design actions are involved.

(3) ENV 1991 also covers structural design during execution and structural design for temporary structures. It relates to all circumstances in which a structure is required to give adequate performance.

(4) ENV 1991 is not directly intended for the structural appraisal of existing construction, in developing the design of repairs and alterations or, for assessing changes of use.

(5) ENV 1991 does not completely cover special design situations which require unusual reliability considerations such as nuclear structures for which specific design procedures should be used.

1.1.2 Scope of ENV 1991-2-5 Thermal Actions

(1)P This Part gives rules and methods of calculating thermal actions on buildings, bridges and other structures including their structural components. Principles needed for cladding and other appendages of the buildings are also provided.

(2) This Part of the Eurocode on Actions on Structures describes the changes in the temperature of structural elements. Characteristic values of thermal actions are presented for use in the design of structures which are exposed to daily and seasonal climatic changes.

(3) Structures in which thermal actions are mainly a function of their use (e.g. chimneys, cooling towers, silos, tanks, warm and cold storage facilities, hot and cold services) are treated in section 7.

(4) The following subjects are dealt with:

Section 1 - General

Section 2 - Classification of actions

Section 3 - Design situations

Section 4 - Representation of actions

Section 5 - Temperature changes in buildings

Section 6 - Temperature changes in bridges

Section 7 - Temperature differences in industrial chimneys and pipelines