



National Standards Authority of Ireland
Údarás um Chaighdeáin Náisiúnta na hÉireann

IRISH STANDARD

I.S. EN 15037-1:2008

ICS 91.100.30

National Standards
Authority of Ireland
Northwood, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
<http://www.nsai.ie>

Sales

<http://www.standards.ie>

**PRECAST CONCRETE PRODUCTS - BEAM-
AND-BLOCK FLOOR SYSTEMS - PART 1:
BEAMS**

*This Irish Standard was
published under the authority
of the National Standards
Authority of Ireland and
comes into effect on:
25 June 2008*

**NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
LAW**

© NSAI 2008

Price Code Z

Údarás um Chaighdeáin Náisiúnta na hÉireann

This page is intentionally left BLANK.

ICS 91.100.30

English Version

Precast concrete products - Beam-and-block floor systems - Part 1: Beams

Produits préfabriqués en béton - Systèmes de planchers à
poutrelles et entrevous - Partie 1: Poutrelles

Betonfertigteile - Balkendecken mit Zwischenbauteilen -
Teil 1: Balken

This European Standard was approved by CEN on 30 June 2007.

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

Contents

Page

The numbering of clauses is strictly related to EN 13369: *Common rules for precast concrete products*, at least for the first three digits. When a clause of EN 13369 is not relevant or included in a more general reference of this standard, its number is omitted and this may result in a gap on numbering.

Foreword.....	4
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Requirements	10
4.1 Material requirements	10
4.2 Production requirements	11
4.3 Finished product requirements	16
5 Test methods	24
5.1 Tests on concrete	24
5.2 Measuring of dimensions and surface characteristics	24
5.3 Weight of the products	25
5.4 Prestressing	25
6 Evaluation of conformity	26
6.1 General	26
6.2 Type testing	26
6.3 Factory production control	26
7 Marking	26
8 Technical documentation	26
Annex A (normative) Inspection schemes for beams	28
A.1 General	28
A.2 Process inspection	28
A.3 Finished product inspection	28
Annex B (informative) Typology of beam-and-block floor systems	30
B.1 General	30
B.2 Floor systems with cast in-situ structural topping	30
B.3 Floor systems with composite topping	31
B.4 Floor systems with partial topping	32
B.5 Floors with self-bearing beams	33
Annex C (informative) Monolithism of composite floor systems	34
C.1 General	34
C.2 Strength of connecting reinforcement	36
C.3 Anchorage of connecting reinforcement	36
Annex D (informative) Detailing of supports and anchorage of reinforcement	39
D.1 General	39
D.2 Construction of supports	39
D.3 Anchorage of reinforcements	47
Annex E (informative) Design of composite floor systems	49
E.1 General	49
E.2 Resisting section of the finished floor system	49

E.3	Design value of the ULS mid-span bending moment (M_{Rd})	53
E.4	Serviceability limit states	54
E.5	Verification of the shear strength in composite systems	58
Annex F	(informative) Design of self-bearing beams	65
F.1	General	65
F.2	Design value of the ultimate limit state bending moment.....	65
F.3	Serviceability limit state of prestressed beams	65
F.4	Design value of the resisting shear force	65
Annex G	(informative) Diaphragm action	66
G.1	General	66
G.2	Case of low rise building	67
Annex H	(normative) Testing to determine erection spans	68
H.1	General	68
H.2	Determination of erection span	68
H.3	Apparatus	69
H.4	Test arrangement	69
H.5	Loading procedure	70
H.6	Interpretation of results	71
H.7	Test report.....	73
Annex J	(informative) Concrete strength at time of release of tendons	74
J.1	General	74
Annex K	(informative) Resistance to fire	76
K.1	General	76
K.2	Fire resistance of beam-and-block floor systems	76
K.3	Determination by testing	76
K.4	Evaluation by calculation	76
K.5	Tabulated data	78
Annex L	(informative) Acoustic insulation	79
L.1	General	79
L.2	Airborne sound insulation.....	79
L.3	Impact sound insulation	79
Annex Y	(informative) Choice of CE marking method.....	81
Y.1	General	81
Y.2	Method 1	81
Y.3	Method 2.....	81
Y.4	Method 3.....	81
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 89/109/EEC, EU Construction Products Directive.....	82
ZA.1	Scope and relevant characteristics	82
ZA.2	Procedure for attestation of conformity of beams for beam-and-block floor systems	84
ZA.3	CE marking and labelling	85

Foreword

This document (EN 15037-1:2008) has been prepared by Technical Committee CEN/TC 229 "Precast concrete products", the secretariat of which is held by AFNOR, and was examined by and agreed with a joint working party appointed by the Liaison Group CEN/TC 229-TC 250, particularly for its compatibility with 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 October 2008, and conflicting national standards shall be withdrawn at the latest by April 2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

European Standard for beam-and-block floor system is made of 5 parts:

- EN 15037-1, *Precast concrete products - Beam-and-block floor systems — Part 1: Beams*
- prEN 15037-2, *Precast concrete products - Beam-and-block floor systems — Part 2: Concrete blocks¹⁾*
- prEN 15037-3, *Precast concrete products - Beam-and-block floor systems — Part 3: Clay blocks¹⁾*
- prEN 15037-4, *Precast concrete products - Beam-and-block floor systems — Part 4: Polystyrene blocks¹⁾*
- prEN 15037-5, *Precast concrete products - Beam-and-block floor systems — Part 5: Lightweight blocks¹⁾*

This standard is one of a series of product standards for precast concrete products.

For common aspects reference is made to EN 13369: *Common rules for precast concrete products*, from which also the relevant requirements of the EN 206-1: *Concrete — Part 1: Specification, performance, production and conformity* are taken.

The references to EN 13369 by CEN/TC 229 product standards are intended to make them homogeneous and to avoid repetitions of similar requirements.

Eurocodes are taken as a common reference for design aspects. The installation of some structural precast concrete products is dealt with by ENV 13670-1: *Execution of concrete structures — Part 1: Common rules*, which has at the moment the status of a European Prestandard. In all countries it can be accompanied by alternatives for national application and it should not be treated as a European Standard.

The program of standards for structural precast concrete products comprises the following standards, in some cases consisting of several parts:

EN 1168, *Precast concrete products — Hollow core slabs*

EN 12794, *Precast concrete products — Foundation piles*

EN 12843, *Precast concrete products — Masts and poles*

1) to be developed

EN 13224, *Precast concrete products — Ribbed floor elements*

EN 13225, *Precast concrete products — Linear structural elements*

EN 13693, *Precast concrete products — Special roof elements*

EN 13747, *Precast concrete products — Floor plates for floor systems*

EN 13978, *Precast concrete products — Precast concrete garages*

EN 14843, *Precast concrete products — Stairs*

EN 14844, *Precast concrete products — Box culverts*

EN 14991, *Precast concrete products — Foundation elements*

EN 14992, *Precast concrete products — Wall elements*

EN 15050, *Precast concrete products — Bridge elements*

prEN 15258, *Precast concrete products — Retaining wall elements*

This standard defines in Annex ZA the application methods of CE marking to products designed using the relevant EN Eurocodes (EN 1992-1-1:2004 and EN 1992-1-2:2004). Where, in default of applicability conditions of EN Eurocodes to the works of destination, design Provisions other than EN Eurocodes are used for mechanical strength and/or fire resistance, the conditions to affix CE marking to the product are described in ZA.3.4.

According to the CEN/CENELEC Internal Regulations, the national standards 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.

Introduction

The evaluation of conformity given in this standard refers to the completed precast elements which are supplied to the market and covers all the production operations carried out in the factory.

For design rules reference is made to EN 1992-1-1:2004. Additional complementary rules are provided where necessary.

Recommendations for beam-and-block floor systems are presented in informative annexes about monolithism of composite floor systems (Annex C), detailing of supports and anchorage reinforcement (Annex D), design of composite floor systems (Annex E), design of self-bearing beams (Annex F), diaphragm action (Annex G), resistance to fire (Annex K) and acoustic insulation (Annex L).

According to 1.2 of EN 1992-1-1:2004 the complementary rules, given in informative annexes in this standard, comply with the relevant principles given in EN 1992-1-1.

Because of the fact that the experimental evidence is mainly based on elements with limited depth and width this standard is applicable to elements with these limited dimensions. This limitation is not intended to prohibit the application of elements with larger sizes, but the experience is not yet wide enough to draw up standardised design rules.

In 4.2.3, 4.3.2, 4.3.3 and 4.3.4, this standard includes specific provisions resulting from the application of EN 1992-1-1:2004 and EN 1992-1-2:2004 rules made specific for the concerned product. The use of these provisions is consistent with a design of works made with EN 1992-1-1:2004 and EN 1992-1-2:2004.

1 Scope

This European Standard deals with the requirements, the basic performance criteria and evaluation of conformity for precast beams made of reinforced or prestressed normal weight concrete according to EN 1992-1-1:2004, with or without clay shell, used in conjunction with blocks in compliance with prEN 15037-2 or prEN 15037-3 or prEN 15037-4 or prEN 15037-5, with or without cast in-situ concrete for the construction of beam-and-block floor and roof systems. Examples of typology of floor and roof systems are given in Annex B.

It is essential that the total depth of the beam be comprised between 60 mm and 500 mm and the beams be at centres of not more than 1,00 m.

For higher depth, it is essential that the precast concrete beams be in compliance with EN 13225.

The products covered by this standard are intended to be used as structural floor and roof systems, including parking areas for light vehicles corresponding to traffic category F of EN 1991-1-1:2002, which are not subjected to fatigue loading.

The products may be used in seismic areas provided they fulfil the requirements specific to this use.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1990:2002, *Eurocode — Basis of structural design*

EN 1992-1-1:2004, *Eurocode 2: Design of concrete structures — Part 1-1: General rules and rules for buildings*

EN 1992-1-2:2004, *Eurocode 2: Design of concrete structures — Part 1-2: General rules — Structural fire design*

EN 10080:2005, *Steel for the reinforcement of concrete — Weldable reinforcing steel — General*

EN 12390-4:2000, *Testing hardened concrete — Part 4: Compressive strength — Specification for testing machines*

EN 13369:2004, *Common rules for precast concrete products*

prEN 15037-2, *Precast concrete products — Beam-and-block floor systems — Part 2: Concrete blocks*

prEN 15037-3, *Precast concrete products — Beam-and-block floor systems — Part 3: Clay blocks*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13369:2004 and the following apply.

3.1

beam

linear structural element of small cross-sectional area, made of reinforced concrete or prestressed concrete, entirely or partially precast

NOTE It may include elements which may or may not contribute to its strength (e.g. clay lower toe, clay shells) as shown in Figure 1

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-