

Precast concrete products — Floor plates for floor systems

ICS 91.100.30

National foreword

This British Standard is the UK implementation of EN 13747:2005+A2:2010, incorporating corrigendum December 2006. It supersedes BS EN 13747:2005+A1:2008 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by CEN corrigendum December 2006 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee B/524, Precast concrete products.

A list of organizations represented on this committee can be obtained on request to its secretary.

EN 13747 is a “harmonized” European Standard and fully takes into account the requirements of the European Commission mandate M/100, Precast concrete products, given under the EU Construction Products Directive (89/106/EEC), and is intended to lead to CE marking.

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 obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 13 January 2006

© BSI 2010

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
17331 Corrigendum No. 1	28 September 2007	Implementation of CEN corrigendum December 2006
	30 June 2009	Implementation of CEN amendment A1:2008
	31 August 2010	Implementation of CEN amendment A2:2010

ISBN 978 0 580 67913 1

English Version

Precast concrete products - Floor plates for floor systems

Produits préfabriqués en béton - Prédalles pour systèmes
de planchers

Betonfertigteile - Deckenplatten mit Ortbetonergänzung

This European Standard was approved by CEN on 17 February 2005 and includes Corrigendum 1 issued by CEN on 6 December 2006, Amendment 1 approved by CEN on 14 September 2008 and Amendment 2 approved by CEN on 14 February 2010.

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, Croatia, 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: Avenue Marnix 17, B-1000 Brussels

Contents

Page

The numbering of clauses is strictly related to EN 13369:2004 Common rules for precast concrete products, at least for the first three digits. When a clause of EN 13369:2004 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.....	5
Introduction	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 Requirements	13
4.1 Material requirements	13
4.1.1 General.....	13
4.1.2 Constituent materials of concrete.....	13
4.1.3 Reinforcing steel.....	13
4.1.4 Prestressing steel.....	13
4.1.5 Inserts and connectors	13
4.2 Production requirements	14
4.2.1 Concrete production	14
4.2.2 Hardened concrete	14
4.2.3 Structural reinforcement.....	14
4.2.4 Positioning of reinforcement.....	16
4.3 Finished product requirements.....	22
4.3.1 Geometrical properties	22
4.3.2 Surface characteristics	23
4.3.3 Mechanical resistance.....	23
4.3.4 Resistance and reaction to fire	25
4.3.5 Acoustic properties	25
4.3.6 Thermal properties	26
4.3.7 Durability	26
4.3.8 Other requirements.....	26
5 Test methods.....	26
5.1 Tests on concrete	26
5.2 Measuring of dimensions and surface characteristics	26
5.2.1 Position of reinforcement	26
5.2.2 Floor plate dimensions	27
5.2.3 Straightness of edges	27
5.2.4 Flatness of the moulded surface.....	27
5.2.5 Surface characteristics	27
5.3 Weight of the products.....	28
5.4 Prestressing	28
5.4.1 Initial prestressing force	28
5.4.2 Slippage of tendons.....	28
6 Evaluation of conformity.....	28
6.1 General.....	28
6.2 Type testing.....	28
6.3 Factory production control.....	29
7 Marking	29

8	Technical documentation	29
Annex A	(normative) Inspection schemes	30
A.1	Process inspection.....	30
A.2	Finished product inspection	31
Annex B	(informative) Types of composite slabs	32
B.1	Scope	32
B.2	Different types of composite slabs.....	32
B.2.1	Solid composite slabs.....	32
B.2.2	Hollow composite slabs.....	32
B.3	Topping	33
Annex C	(informative) Stiffening ribs and void formers	34
C.1	Stiffening ribs	34
C.1.1	Nominal width of ribs	34
C.1.2	Nominal height of ribs.....	34
C.1.3	Nominal space between ribs	34
C.1.4	Distance between the edge of the floor plate and the centre line of the nearest rib	35
C.1.5	Specific case of reinforced floor plate with a single rib	35
C.2	Void formers	36
C.3	Additional examples of stiffening ribs and ball void formers	37
C.3.1	General	37
C.3.2	Dimensions	38
Annex D	(informative) Monolithism of composite slabs	40
D.1	General	40
D.2	Strength of connecting reinforcement	41
D.3	Anchorage of connecting reinforcement.....	41
Annex E	(informative) Detailing of support joints and anchorage of reinforcement of composite slabs.....	44
E.1	Scope	44
E.2	General	44
E.2.1	Effective support length	44
E.2.2	Types of connections.....	45
E.3	Anchorage of lower reinforcements of the composite slab.....	47
E.3.1	Anchorage on the end support	47
E.3.2	Anchorage in special cases	49
Annex F	(informative) Design of composite slab	53
F.1	General	53
F.2	Connections between adjacent floor plates	53
F.3	Bending ultimate limit state	55
F.4	Serviceability limit state	55
F.4.1	General	55
F.4.2	Serviceability limit state design of composite slab made of reinforced floor plate	56
F.4.3	Serviceability limit states design of composite slabs made of prestressed floor plates	59
F.5	Transverse bending design of composite slab.....	59
Annex G	(informative) Concrete strength at time of prestressing.....	61
G.1	General	61
G.1.1	Procedure	61
G.1.2	Interpretation of results	61
Annex H	(informative) Composite slabs with void formers.....	63
H.1	General	63
H.2	Material properties	63
H.2.1	Polystyrene/Air voids.....	63
H.2.2	Clay	63
H.3	Temperature profiles.....	64
H.4	Other items to be considered.....	64
Annex J	(normative) Testing to determine erection spans (type testing)	65

J.1	General.....	65
J.2	Determination of erection span.....	65
J.2.1	Failure design (condition a).....	66
J.2.2	Checking of the deflection (condition b).....	67
J.3	Equipment	67
J.4	Preparation of test piece.....	67
J.5	Loading	69
J.6	Interpretation of results	69
J.7	Test report	70
Annex K (informative)	Anchorage capacity of loops.....	71
Annex ZA (informative)	Ⓐ Clauses of this European Standard addressing the provisions of the EU Construction Products Directive.....	74
ZA.1	Scope and relevant characteristics	74
ZA.2	Procedure for attestation of conformity of floor plates for floor systems.....	76
ZA.2.1	System of attestation of conformity	76
ZA.2.2	EC Certificate and Declaration of conformity.....	77
ZA.3	CE marking and labelling.....	78
ZA.3.1	General.....	78
ZA.3.2	Declaration of geometrical data and material properties (method 1).....	80
ZA.3.3	Declaration of product properties (method 2)	82
ZA.3.4	Declaration of compliance with a given design specification provided by the client (method 3a).....	84
ZA.3.5	Declaration of compliance with a given design specification provided by the manufacturer according to the client's order (method 3b)	85



Foreword





This document (EN 13747:2005+A2:2010) 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-CEN/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 September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard includes Corrigendum 1 issued by CEN on 2006-12-06, Amendment 1 approved by CEN on 2008-09-14 and Amendment 2 approved by CEN on 2010-02-14.

This document supersedes  EN 13747:2005+A1:2008 .

The start and finish of text introduced or altered by amendment is indicated in the text by tags   and  .

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags  .

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 89/106/EEC.

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

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 products*, from which also the relevant requirements of the EN 206-1: *Concrete — Part 1: Specification, performances, 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 shall not be treated as a European standard.

The programme of standards for structural precast concrete products comprises the following standards, in some cases consisting on 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*
- EN 13747, *Precast concrete products — Floor plates for floor systems*

-  prEN 15037, *Precast concrete products — Beam-and-block floor systems* 
- EN 13224, *Precast concrete products — Ribbed floor elements*
- EN 13225, *Precast concrete products — Linear structural elements*
- EN 14992, *Precast concrete products — Wall elements*
- EN 13693, *Precast concrete products — Special roof elements*
- EN 14844, *Precast concrete products — Box culverts*
- EN 13978, *Precast concrete products — Precast concrete garages*
- EN 14991, *Precast concrete products — Foundation elements*
- EN 15050, *Precast concrete products — Bridge elements*
- EN 14843, *Precast concrete products — Stairs*

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, Croatia, 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 the 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.

In clauses 4.3.3 and 4.3.4, the present 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.