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Montažni betonski izdelki - Rebraste etažne plošče - 1. del: Bistvene značilnosti

Precast concrete products - Ribbed floor elements - Part 1 : Essential characteristics

Betonfertigteile - Deckenplatten mit Stegen - Teil 1: Wesentliche Merkmale

Produits préfabriqués en béton - Eléments de planchers nervurés - Partie 1 : Caractéristiques essentielles

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English Version

Precast concrete products - Ribbed floor elements - Part 1 : Essential characteristics

Produits préfabriqués en béton - Eléments de planchers nervurés - Partie 1 : Caractéristiques essentielles

Betonfertigteile - Deckenplatten mit Stegen - Teil 1: Wesentliche Merkmale

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 229.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 13224-1:2020) has been prepared by Technical Committee CEN/TC 229 “Precast concrete products”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13224:2011.

The main changes are the splitting in two parts, with for the present part 1 identifying the essential characteristics of ribbed floor elements:

— clarification of the scope;

— updating of the AVCP clause;

— removal of clauses related to production;

— removal of informative annexes.

Normative references were updated. No technical change was made.

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

For relationship with Regulation (EU) No 305/2011 for construction products (CPR), see informative Annex ZA, which is an integral part of this document.

1 Scope

This document identifies the essential characteristics of ribbed floor elements. These elements are precast elements made of reinforced or prestressed normal weight or light weight concrete, used in floors or roofs. They consist of a top and/or bottom slab and one or more (usually two) ribs; transverse ribs may also be present. The concrete does not contain more than 1 % of homogeneously distributed organic material, by mass or by volume (whichever is the most onerous).

When used in roofs, these elements are used in the same way as for a floor, the difference being in the type of covering and the loads they support.

This document specifies procedures for assessment and verification of constancy (AVCP) of performance of characteristics of the ribbed floor elements as well as marking and labelling of these elements.

NOTE This document does not cover load-bearing capacity determined by testing.

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 13369:2018, *Common rules for precast concrete products*

EN 12390-7:2019, *Testing hardened concrete — Part 7: Density of hardened concrete*

EN 13501-2:2018, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

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

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

NOTE References to EN 1992-1-1 and EN 1992-1-2 imply in return references to the whole Eurocode standards series and their National Annexes when and where required for their application.

[1] As impacted by EN 1992-1-1:2004/AC:2010 and EN 1992-1-1:2004/A1:2014.

[2] As impacted by EN 1992-1-2:2004/AC:2008 and EN 1992-1-2:2004/A1:2019.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1992-1-1:2004[1] and EN 13369 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
(precast) ribbed floor element
(precast) unit consisting in a slab stiffened by one or more ribs

3.2
declaration method (for mechanical strength and resistance to fire)
method chosen to declare the product performance for mechanical strength and resistance to fire. These methods do not apply to other essential characteristics. The allowed methods are:

a) Method 1: declaration of detailing and material properties

b) Method 2: declaration of geometry, material properties and product properties determined following this standard and EN Eurocodes;

c) Method 3a: declaration of product compliance with a given design specification provided by the client;

d) Method 3b: declaration of product compliance with a given design specification provided by the manufacturer according to the client's order

3.3
design specifications
set of documents related to the design of the product containing relevant information (e.g. calculation sheets, drawings ...) taking into account the applicable declaration method with the objective of declaring its characteristics

3.4
detailing
positioning of the reinforcement and geometrical data

4 Product characteristics

4.1 Compressive strength of concrete

When declared, the characteristic value of the compressive strength of concrete shall be determined according to 5.1 of this document and shall be expressed in MPa.

4.2 Ultimate tensile and tensile yield strength of steel

4.2.1 Reinforcing steel

When declared, the following values shall be based on the values declared by the reinforcing steel provider:

— ultimate tensile strength: characteristic value in MPa;

— tensile yield strength: characteristic value in MPa.

4.2.2 Prestressing steel

When declared, the following values shall be based on the values declared by the reinforcing steel provider:

— ultimate tensile strength: characteristic value in MPa;

— tensile 0,1 % proof-stress: characteristic value in MPa.

4.3 Dry density of lightweight concrete

For lightweight concrete, when declared the dry density shall be determined according to EN 13369:2018, 4.2.2.5 and expressed in kg/m^3.

4.4 Mechanical strength

4.4.1 Method 1

When declared according to Method 1, the mechanical strength of the product is established through the following set of characteristics:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— detailing: see 4.7.

4.4.2 Method 2

When declared according to Method 2, the relevant mechanical characteristics of the product are established by the manufacturer through:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— reference to the documented design specification.

4.4.3 Method 3a

When declared according to Method 3a, the relevant mechanical characteristics of the product are established by the client through:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— reference to the design specification provided by the client.

4.4.4 Method 3b

When declared according to Method 3b, the relevant mechanical characteristics of the product are established by the manufacturer through:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— reference to the given design specification provided by the manufacturer according to the client's order.

4.5 Reaction to fire

Following Commission Decision 96/603/EEC as amended by Commission Decision 2000/605/EC, products belonging to the scope of this documen belong to reaction to fire Class A1 without the need for testing.

4.6 Resistance to fire

4.6.1 Method 1

When declared according to Method 1, the resistance to fire of the product is established through the following set of characteristics:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— detailing: see 4.7.

4.6.2 Method 2

When Method 2 is used, fire resistance dealing with load bearing capacity R of ribbed floor elements, expressed in terms of classes, shall be declared according to one of the following classification methods:

a) Classification by testing:

Tests previously performed in accordance with the requirements of EN 13501-2:2018 (i.e. same product, same or more demanding test method) may be taken into account.

The validity of test results can be extended to other spans, cross-sections and loads by appropriate calculation methods (see e.g. c) below).

b) Classification by tabulated data:

Tabulated data shall be taken from EN 1992-1-2:2004.

c) Classification by calculation:

For classification based on calculation methods, the relevant clauses of EN 1992-1-2:2004 shall apply and can be carried out using the thermal maps given in Annex A.

4.6.3 Method 3a

When declared according to Method 3a, the resistance to fire of the product is established by the client through:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— reference to the design specification provided by the client.

4.6.4 Method 3b

When declared according to Method 3b, the resistance to fire of the product is established by the manufacturer through:

— compressive strength of concrete: see 4.1;

— ultimate tensile and tensile yield strength of steel: see 4.2;

— reference to the given design specification provided by the manufacturer according to the client's order.

4.7 Detailing

When declared, the description of detailing shall be made available by reference to production documentation or structural design calculations.

5 Testing, assessment and sampling methods

5.1 Compressive strength of concrete

For the determination of the characteristic value of the compressive strength of concrete, EN 13369:2018, 4.2.2.2 and 5.1.1 shall apply.

5.2 Detailing

See EN 13369:2018, 5.2.

6 Assessment and verification of constancy of performance – AVCP

6.1 General

The technical details necessary for the implementation of the systems of assessment and verification of constancy of performance (AVCP) comprise provisions with regards to:

— the assessment of the performance of the ribbed floor elements, which may be carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product; and

— the applicable factory production control (FPC).

6.2 Assessment of performance

6.2.1 General

When the intention is to declare any performance related to characteristics included in Annex ZA of this standard this shall be carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product, in accordance with Clause 'Characteristics'.

Assessment previously performed in accordance with the provisions of this standard, may be considered, provided that this assessment was performed to the same or a more rigorous assessment method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

For the purposes of assessment, the products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristic for all products within that same family.

NOTE Products can be grouped in different families for different characteristics.

In addition, the determination of the product type shall be:

— carried out for all characteristics included in the standard for which it is intended to declare the performance:

  — on first application of this standard; or

  — at the beginning of the production of a new or modified ribbed floor elements, unless a member of the same product family; or

  — at the beginning of a new or modified method of production, where the modification may affect the stated properties;

— repeated for the characteristic(s) in question, whenever a change occurs in the ribbed floor elements design, in the raw material(s) or in the supplier of the components, and/or in the method of production (subject to the definition of a family), which may affect significantly the performance of one or more of the characteristics;

Where components are used whose performance in relation to their characteristics has already been determined on the basis of assessment methods of other harmonized technical specifications and those components bear CE marking in accordance with those harmonized technical specifications, these performances do not need to be re-assessed, if the intended use and the assessment methods of this standard correspond to previously used. The specifications of these components shall be documented.

6.2.2 Test samples, testing and compliance criteria

The samples of ribbed floor elements to be tested/assessed shall be in accordance with Table 1.

Table 1 — Number of samples to be tested and assessment criteria

Characteristic	Clause	Assessment method	No. of samples	Assessment criteria
Compressive strength of concrete	4.1	5.1	See EN 13369:2018, 6.2.2	See EN 13369:2018, 6.2.2
Ultimate tensile and tensile yield strength (of steel)	4.2	Information given by the supplier	Not relevant	Compliance with the value to be declared
Mechanical strength (Method 1)	4.4.1	Compressive strength of concrete: see 5.1	See EN 13369:2018, 6.2.2	See EN 13369:2018, 6.2.2
		Ultimate tensile and tensile yield strength of steel: (given by supplier)	Not relevant	Compliance with the value to be declared
		Detailing (see 5.2)	3 elements	Compliance with drawings and specified tolerances