SLOVENSKI STANDARD
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Montažni betonski izdelki – Urbano in vrtno pohištvo

Precast concrete products - Street furniture and garden products

Betonfertigteile - Straßenmöbel und Gartengestaltungselemente

Produits préfabriqués en béton - Mobilier urbain et de jardin

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This European Standard was approved by CEN on 10 March 2003.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 13198:2003) has been prepared by Technical Committee CEN/TC 229 “Precast concrete products”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

Annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard covers a vast range of products, which are widely used in our daily environment and have an important decorative function. Bearing in mind the great variety of these products, the standard sets minimum requirements for the various products and specific requirements for some particular products.

1 Scope

This European Standard specifies the requirements for street furniture and garden products in precast concrete.

This kind of prefabricated, non-structural products and accessories can be used in public and private areas such as gardens, parks, foot-paths, squares, essentially for the landscaping, without, however, being subject to loads resulting from vehicle traffic. They can also be used for internal applications.

Examples are : products for the furnishing of spaces such as benches, seats, tables, playshapes, step blocks, flower boxes, plant containers, fountains, billboards, street signs, traffic marking signposts, illuminated boards, barbecues, mailboxes, clothesline posts, litter bins, statues, decorative columns and bollards, copings; products for soil erosion control such as piled flower boxes, banks with vegetation with no superimposed load and not exceeding a total height of 1 m; floorscape products such as tree frames and grids, gratings, stepping stones.

This Standard does not cover paving units, flags, kerbs, fences, drainage channels, safety barriers, retaining walls nor sound barriers.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12620:2002, *Aggregates for concrete.*

EN 13369:2001, *Common rules for precast concrete products.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1
actual dimension
the dimension found by measurements

3.2
continuous use of elements
arrangement of elements each adjoining the preceding one, the position of each element depending on the key-dimension of the next identical element

3.3
corrosion protected reinforcement
steel which is inherently resistant to corrosion or has been coated with a protective material e.g. zinc-coated reinforcement, reinforcement of stainless steel, epoxy-coated

3.4
(concrete) cover
distance between the nearest concrete surface and the surface of reinforcement

3.5
design (nominal) cover
value of the cover thickness quoted in the project documentation and referred to the clear distance from the steel reinforcement to the concrete surface

3.6
lightweight concrete
concrete having an oven-dry density of not less than 800 kg/m and not more than 2000 kg/m^3. It is produced using lightweight aggregate for all or part of the total aggregate

3.7
minimum cover
minimum cover thickness given by the design cover reduced by the tolerance

3.8
normal weight concrete
concrete having an oven-dry density of not less than 2000 kg/m^3 but not exceeding 2600 kg/m^3

3.9
secondary processing
manufacturing process to texture the whole product or any surface, carried out after basic manufacture (i.e. washing or sand blasting)

3.10
work (design*)* dimension
the dimension targeted by the manufacturer and generally complying with the dimension indicated in the project or in the manufacturer documentation

4 Requirements

4.1 Material requirements

For material requirements, the clause 4.1 of EN 13369:2001 shall be applied.

4.2 Production requirements

For production requirements, the clause 4.2 of EN 13369:2001 shall be applied.

Additionally, the concrete shall meet one of the minimum strength requirements in Table 1. The minimum class to ensure durability is given in Table 1, in relation to the kind of concrete that is used.

The manufacturer may demonstrate compliance using alternative test methods to the compressive test (e.g. splitting or bending carried out on a test specimen or the unit).

Table 1 — Minimum compressive strength class

Type of concrete	Minimum compressive strength class (on cylinder/on cube) N/mm^2
normal weight concrete	C25/30
normal weight concrete with no upper sieve size coarse aggregates exceeding D = 5,6 mm	C20/25
lightweight concrete	LC12/13

4.3 Finished product requirements

4.3.1 Geometrical characteristics

Dimensional tolerances are only relevant for alignment and/or interlocking. The producer shall declare the key-dimension for which the dimensional tolerances shall then conform to Table 2 (see 5.2).

Table 2 — Dimensional tolerances depending on the key-dimension and use

Key dimension	Continuous use	Discontinuous use
≤ 1 m	± 5 mm	± 15 mm
> 1 m	± 10 mm	± 15 mm

For interlocking units in particular, tolerances shall be declared by the manufacturer and shall be such as to permit interlocking.

4.3.2 Surface characteristics

If cracks are visible under the conditions specified in 5.3 the product is unacceptable.

The appearance is subjective. It is advisable that the acceptable limits can be determined by comparison with approved samples or documentation of the producer or with the CIB-scales (CIB report N. 24).

4.3.3 Concrete cover to reinforcement

Depending upon the type of concrete, the compressive strength class and the water absorption in mass of the concrete used, the minimum concrete cover (see 5.6*)* shall not be less than specified in Table 3.

Table 3 — Minimum concrete cover

Type of concrete	Minimum compressive strength class	Maximum water absorption %	Minimum concrete cover mm	Remarks
normalweight concrete	C 20/25	/	20	Only for normal weight concrete with no upper sieve size coarse aggregates exceeding D=5,6mm. When corrosion protected reinforcement is used, the min. concrete cover may be reduced by 5 mm
	C25/30	/	20	When corrosion protected reinforcement is used, the min. concrete cover may be reduced by 5 mm.
	C 30/37 C 35/45	6,5	15	
	C 40/50	6	10	Only for products with a maximum thickness of less than 80 mm.
lightweight concrete	LC 12/13	/	20	Only corrosion protected reinforcement should be used.
NOTE Moreover, the product should have a concrete cover of at least 1,25 times the upper sieve size (D) of coarse aggregate according to EN 12620.				

4.3.4 Safety in use

Requirements for safety in use shall be considered for the intended final use of the products.

The manufacturer shall indicate the limiting service conditions for products for soil erosion control such as piled flower boxes, banks with vegetation etc., such as a maximum height and, possibly, occasional load for access to or maintenance of the works.

Safety in use shall be checked by design or test loading. Moreover, for fixed products, the producer shall provide guidelines for erection, handling and intended usage.

4.3.5 Weathering resistance

4.3.5.1 Products for external use, not subjected to freeze/thaw conditions

For normal weight concrete, water absorption shall not exceed 7,5 % (see 5.4).

4.3.5.2 Products for external use, subjected to freeze/thaw conditions and not in contact with de-icing salt

Products for external use not in contact with de-icing salt are exempted from direct freeze/thaw tests (see 5.7) if they meet both of the following requirements:

a) for normal weight concrete, the water absorption shall be less than 7 % in mass; for lightweight concrete, the water absorption shall be less than 15 % in mass;

b) for normal weight concrete, the minimum strength class shall be C 30/37; for lightweight concrete, the minimum strength class shall be LC 12/13.

When the direct freeze/thaw test (see 5.7) is used and if appearance is important, after the test, no projections, depressions, flakes or crazes shall be visible on the product from a distance of 2 m in daylight and dry surface conditions.

4.3.5.3 Products for external use, subjected to freeze/thaw conditions and in contact with de-icing salt

Products for external use, subjected to freeze/thaw conditions and in contact with de-icing salt are exempted from direct freeze/thaw tests (see 5.8) with de-icing salt if they meet both of the following requirements:

a) the water absorption shall be less than 6,0 % in mass;

b) minimum strength class shall be C 35/45.

Additionally, frost resisting aggregates shall be used for products with secondary processing in accordance with clause 5 of EN 12620:2002.

When the direct freeze/thaw test with de-icing salt (see 5.8) is used, the maximum mass loss shall be 1,5 kg/m^2.

4.3.6 Other requirements

Some products have additional requirements linked to their specific use. These kinds of requirements shall only be considered when relevant. A product may have to meet several specific requirements.

The properties of the products which indicate the fitness-for-use shall be demonstrated by the manufacturer.

For example:

— bicycle stands shall have dimensions and dimensional tolerances so as to receive and to hold bicycles safely (e.g. bicycles in a row shall not touch each other's cables or steering);

— products intended to contain water shall be watertight under the appropriate condition;

— products with electrical connections shall be checked for conformity with applicable electrical safety regulations; they shall satisfy a variety of performance criteria including one or more of the following:

  — strength: the capacity of these to resist the forces to which they will be subjected during their lifetime including those caused by external loads, restraint or imposed deformations and those required to maintain stability;

  — ductility: strictly defined as the ability of these to accommodate relatively large inelastic deformations without a significant decrease in capacity; they should have capacity to sustain overloads without precipitous strength loss;

  — durability: the resistance of these to the adverse effects of variations in temperature and exposure to moisture or other corrosive agents, according to previous use.

5 Test methods

5.1 General

The tests described in this standard, or in the absence of these, the tests described in the corresponding EN(V) shall be reference tests.

The manufacturer may propose alternative methods to those described in this standard, providing a correlation with the reference method is established.

5.2 Dimensions

Measuring equipment shall be accurate to ± 0,5 mm taken in the area of use.

5.3 Appearance

An observer stands at a minimum distance of two metres from the products and/or the samples to be compared in daylight and dry surface condition.

5.4 Measuring of water absorption

The test method given in 5.1.2 of EN 13369:2001 shall be applied.

5.5 Compressive strength

The test method given in 5.1.1 of EN 13369:2001 shall be applied.

5.6 Concrete cover

The measurement of the concrete cover of the reinforcement may be destructive or non-destructive to an accuracy established by tests against known cover. For exposed-aggregate finishes, the result shall not take account of the outer non-coated part of the aggregate.

5.7 Freeze/thaw resistance without de-icing salt

The test method given in informative annex A should apply.

5.8 Freeze/thaw resistance with de-icing salt

The test method given in informative annex B should apply.

6 Evaluation of conformity

6.1 General

Clause 6.1 of EN 13369:2001 shall apply.

6.2 Type testing

Clause 6.2 of EN 13369:2001 shall apply.

6.3 Factory production control

It is recommended to apply clauses 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5. and 6.3.6 of EN 13369:2001.