



SLOVENSKI STANDARD

SIST EN 12839:2002

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Betonski izdelki - Elementi za ograje

Precast concrete products - Elements for fences

Vorgefertigte Betonerzeugnisse - Betonelemente für Zäune

Produits préfabriqués en béton - Eléments pour clôtures

Ta slovenski standard je istoveten z: **EN 12839:2001**

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ICS:

91.090	Konstrukcije zunaj stavb	External structures
91.100.30	Beton in betonski izdelki	Concrete and concrete products

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English version

Precast concrete products - Elements for fences

Produits préfabriqués en béton - Eléments pour clôtures

Vorgefertigte Betonerzeugnisse - Betonelemente für Zäune

This European Standard was approved by CEN on 2 March 2001.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by November 2001, and conflicting national standards shall be withdrawn at the latest by February 2003.

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

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

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European standard covers prefabricated concrete elements (in reinforced or prestressed concrete) which can be used together or in combination with other elements to erect fences e.g. boundary fences.

The intended uses may be nonstructural or lightly structural.

The current concrete elements include posts, solid or open panels, slabs, rails, spurs, struts and base panels.

It provides for the evaluation of conformity of elements to this European Standard. Marking conditions are included.

NOTE Annex A intends to provide information on the possible types of fences in which these elements may be part of.

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 206-1:2000, *Concrete - Performance, production and conformity*

EN 12350-1, *Testing fresh concrete – Part 1: Sampling*

EN 12390-1, *Testing hardened concrete – Part 1: Shape, dimensions and other requirements for specimens and moulds*

[SIST EN 12839:2002](https://standards.iteh.ai/catalog/standards/sist/4a1f5c42-827c-4bb2-9132-a3a161509254/sist-en-12839-2001)

EN 12390-2, *Testing hardened concrete – Part 2: Making and curing specimens for strength tests*

prEN 12390-3:2001, *Testing hardened concrete – Part 3: Compressive strength of test specimens*

EN 12390-4, *Testing hardened concrete – Part 4: Compressive strength - Specification for testing machine*

3 Terms and definitions

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

3.1 Types of fences

Annex A provides illustrations of typical fences

3.1.1

solid fence

fence made of posts and solid panels or cladding

3.1.2

open-work fence

fence made of posts and open-work panels possibly including solid panels

3.1.3

mesh or wire fence

fence made of posts and woven or welded wire mesh, and/or wires

3.1.4

mixed fence

fence made of posts and a combination of different elements with at least one base panel

3.1.5

rail fence

fence made of posts and rails

3.1.6

anti-intruder fence

mesh fence, solid fence or mixed fence with an enhanced level of security provided by the addition of barbed wire, barbed tape or similar attached to posts with cranked or vertical extensions

3.2 Post

Vertical element of reinforced or prestressed concrete, intended to be buried or fastened at its base

NOTE This element is designed to accommodate solid or open-work panels and/or rails, meshes or wires.

3.2.1

intermediate post

post used in the fence line, interposed between ends, direction changes and straining points (if any)

3.2.2

accessory post

post shaped and designed to provide a particular function

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3.2.2.1

corner post

post used at a change of direction

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3.2.2.2

end post

post used at the extremity of a fence line

3.2.2.3

straining post

post from which tension wires are stretched, with or without struts (e.g. end-straining post, corner post, intermediate straining post)

3.2.2.4

gate post

post used to support a gate

3.3 Rail

horizontal element of reinforced or prestressed concrete, connected to and supported by the post

NOTE Rails for sports grounds are distinguished from other types of rails.

3.4 Panel

3.4.1

solid panel

panel of reinforced concrete

3.4.2

open-work panel

panel with regular or varied open-work patterns

3.4.3

base panel

panel of reinforced concrete used between posts at ground level

3.5 Spur

short post intended to support a fence post made with a material other than concrete

3.6 Strut

element designed to provide support to post carrying horizontal loads

3.7 Dimension

3.7.1

work dimension

dimension specified by the manufacturer and generally complying with the dimension indicated in the project or in the manufacturer technical documentation

NOTE The design height of the posts for solid fences is the height of the solid part of the fence.

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3.7.2

actual dimension

dimension found by measurements

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3.8 Surface finish

3.8.1

surface finish as cast

surface finish obtained at demoulding, if necessary after surfacing or finishing

3.8.2

surface finish treated

surface finish obtained after complementary treatment on the concrete in fresh state or in hardened state

3.9 Heat treatment

the process of heating the fresh concrete in order to accelerate cement hydration where the temperature of the concrete after compaction is above 45 °C or is in excess of 25 °C above the ambient temperature

3.10 Loadbearing capacity

loadbearing capacity is the ability of an element to resist a maximum failure load

3.11 Complementary loadbearing capacity

complementary loadbearing capacity is the ability of an element to resist a defined load under service conditions and a defined failure load.

4 Requirements

4.1 Material requirements

Only materials with established suitability shall be used.

For a material, the establishment of suitability may result from a European Standard which refers specifically to the use of this material in concrete or in concrete products ; it may also result, under the same conditions, from an ISO Standard.

Where this material is not covered by a European or ISO Standard, or if it deviates from the requirements of these standards, the establishment of suitability may result from :

— the relevant national standards or provisions valid in the place of use of the product which refers specifically to the use of this material in concrete or in concrete products ;

or

— a European Technical approval specifically to the use of this material in concrete or concrete products.

For new materials, where none of the above requirements can be satisfied, the properties shall be documented by theoretical and/or experimental evaluation.

4.2 Production requirements

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4.2.1 Concrete production

4.2.1.1 Composition

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4.2.1.1.1 Use of admixtures

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The total amount of admixtures, if any, shall not exceed the maximum dosage recommended by the admixture producer and not exceed 50 g/kg cement except where higher amounts of admixtures are necessary in special cases, e. g. for high strength concrete. The influence of the higher dosage on the performance and the durability of the concrete shall be considered.

Admixtures used in quantities less than 2 g/kg cement are only permitted if they are dispersed in part of the mixing water.

If the total quantity of liquid admixtures exceeds 3 l/m³ of concrete, its water content shall be taken into account when calculating the water/cement ratio.

The compatibility of the admixtures shall be checked in the initial tests where more than one admixture is used.

4.2.1.1.2 Chloride content

For chloride content EN 206-1:2000, 5.2.7 applies.

4.2.1.1.3 Resistance to alkali-silica reaction

Where aggregates contain varieties of silica susceptible to attack by alkalis (Na₂O and K₂O originating from cement or other sources) and if the product is exposed to humid conditions, special precautions in the choice of constituents shall be taken.

4.2.1.2 Concrete temperature

The temperature of fresh concrete shall not be less 5 °C at the time of placing.

4.2.1.3 Curing

All surfaces of newly cast element shall be protected against drying out if necessary.

4.2.1.4 Heat treatment

Where heat treatment (see 3.9) is applied to concrete in order to accelerate its hardening, it shall be demonstrated by initial test that the required strength is achieved for each concrete batch.

4.2.1.5 Early compressive strength of concrete for prestressed products

The minimum compressive strength at transfer of the prestress force shall be 25 N/mm².

4.2.2 Hardened concrete

4.2.2.1 Compressive strength

Under the test conditions defined in 5.5, the characteristic compressive strength of concrete for the fractile 0,05 ¹⁾, after a 28 days hardening, shall be at least equal to the values given in Table 1.

Moreover no specimen shall have a compressive strength less than 0,8 times the characteristic value.

Table 1 — Characteristic compressive strength

Concrete	Reinforced concrete		Prestressed concrete	
	Cylinders N/mm ²	Cubes N/mm ²	Cylinders N/mm ²	Cubes N/mm ²
Characteristic compressive strength of concrete for the fractile 0,05	35	45	40	50

4.2.2.2 Tensile strength

Not relevant.

4.2.3 Reinforcement

4.2.3.1 Length of longitudinal reinforcement for posts

The length of the reinforcement shall not be less than the length of the element minus 100 mm.

4.2.3.2 Position of prestressing steel wires

For prestressing wires of diameter d mm the minimum concrete cover to the surface of any wire shall be 2,5 d or 10 mm whichever is the greater. The minimum spacing between wires shall be 4 d mm centre to centre. The requirements of 4.3.8.2 also apply.

¹⁾ This means that statistical interpretation of the tests results demonstrate that 95 % of the corresponding production are at least equal to the specification.

4.3 Finished product requirement

4.3.1 Geometrical properties

The dimensions of the elements are not fixed.

4.3.1.1 Production tolerances

Under the test conditions defined in 5.1, actual dimensions shall conform to the corresponding work dimensions within the following limits:

a) posts :

- length : $\pm 1 \%$
- cross-section dimensions : $\pm 3 \text{ mm}$
- straightness : $\leq 0,5 \%$
- location of holes : $\pm 5 \text{ mm}$

b) rails :

- length (between supports) : $\pm 5 \text{ mm}$
- cross-section dimensions : $\pm 3 \text{ mm}$
- straightness : $\leq 0,5 \%$

c) panels :

- length : $\pm 5 \text{ mm}$
- height : $\pm 3 \text{ mm}$
- thickness : $\pm 2 \text{ mm}$
- squareness : difference between diagonals : $\leq 0,5 \%$ of their effective mean value
- flatness : $\leq 0,2 \%$ of the length

4.3.2 Surface characteristics

4.3.2.1 Surface finish as cast

In accordance with annex B, the total surface area of blowholes shall not exceed 3 % of the concrete surface and no blowhole shall exceed 150 mm² (scale 5 of CIB document n°24).

4.3.2.2 Surface finish treated

(see 5.3.2)

NOTE Possible efflorescences due to lime or water migrations have no effect on the performances of the elements ; they reduce progressively with time.

4.3.2.3 Ends of the elements

For prestressed elements the ends of the wires shall be flushed with the visible parts of the elements, then coated with a waterproofing product provided there is adequate data on its durability.

Top ends of reinforced posts shall be shaped to allow water runoff.

4.3.2.4 Interlocking surfaces

Interlocking surfaces shall have no flaw or burr which could hinder the assembly of the elements.

4.3.3 Mechanical resistance

4.3.3.1 Loadbearing capacity

As defined in 3.10 the loadbearing capacity shall be declared according to the result of the load testing as described in 5.6.1.

4.3.3.2 Complementary loadbearing capacity

An element shall withstand a complementary loadbearing capacity as defined in 3.11 corresponding to:

- its minimum failure load or, for posts, its normal service and failure loads ;
- in the case of posts for solid fences, the class of wind under end use conditions, when tested in accordance with 5.6.2.

4.3.3.2.1 Basis of the requirements for mechanical properties

The requirements for mechanical properties of the elements (Tables 3 to 10) are based on :

- a) a maximum above-ground height equal to 2,50 m (excluding extensions for barbed wires) ;
- b) a centre to centre distance between posts of :
 - 2 m for solid fences and rails for sports grounds ;
 - 3 m for mesh or wire fences ;
 - 2,5 m for other types of fences ;
- c) classes of wind for posts for solid fences :
 - Three classes of wind are defined in Table 2.

For different fence heights or post centres, properties shall be determined by interpolation.

Table 2 — Classes of wind for posts for solid fences

Classes of wind	Wind characteristics		
	Normal wind speed		Basic dynamic pressure ^a
	km/h	m/s	
A	100	28	5.10 ⁻⁴
B	120	33	7.10 ⁻⁴
C	140	39	9.10 ⁻⁴

^a Conventional value at 10 m above ground, for a normal site, without screen effect, on an element of which the largest dimension is 0,50 m

4.3.3.2.2 Mechanical resistance of posts

Under the test conditions defined in 5.6.2, posts shall meet the following requirements :

- a) at the limit of working conditions : after release of the normal service load (Tables 3 to 6) the deflection shall not exceed 1 % of the element's above-ground length, and any cracks shall be closed ;
- b) at the ultimate limit state : the failure load shall be at least equal to the value of the normal failure load (Tables 3 to 6) for the fractile 0,05 ¹⁾.

Moreover, no post shall have a failure load of less than 0,8 times the normal failure load.

NOTE It is recommended that posts for solid fences of at least class B should be used on the sea front or in exposed areas. Local provisions valid in the place where the fence is to be erected should be considered.

The mechanical resistance of posts requirements 4.3.3.2.2 apply but normal and failure loads are increased by 50 %.

For dimensions which exceed those indicated in the tables, the required mechanical properties shall be defined individually.

The values of loads for intermediate posts are :

Table 3 — Intermediate posts for solid fences

Above-ground height of the slabs (m)		1,00	1,50	2,00	2,50
Class of wind	Class of post	Normal service load (N)			
A	A	1 400	1 400	1 800	2 200
B	B	1 400	1 800	2 500	3 100
C	C	1 400	2 300	3 200	4 000
Class of wind	Class of post	Normal failure load (N)			
A	A	2 300	2 300	3 200	4 000
B	B	2 300	3 200	4 500	5 600
C	C	2 600	4 100	5 700	7 200

Table 4 — Intermediate posts for open-work fences and posts for mixed fences with a height of the solid part longer than 900 mm

Above-ground height of panels (m)	≤ 1,20	1,50	2,00	2,50
Normal service load (N)	1 400	1 400	1 800	2 200
Normal failure load (N)	2 300	2 300	3 200	4 000

Table 5 — Intermediate posts for mesh or wire fences and posts for mixed fences with a height of the solid part lower or equal to 900 mm

Above-ground height of posts (m)	≤ 1,20	1,50	2,00	2,50
Normal service load (N)	1 400	1 400	1 400	1 400
Normal failure load (N)	2 100	2 100	2 100	2 100

1) This means that statistical interpretation of the tests results demonstrates that 95 % of the corresponding production are at least equal to the specification.