# SLOVENSKI STANDARD
# SIST EN 12843:2004

**01-oktober-2004**

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**Montažni betonski izdelki - Stebri in drogovi**

Precast concrete products - Masts and poles

Betonfertigteile - Maste

Produits préfabriqués en béton - Mâts et poteaux



**Ta slovenski standard je istoveten z:** **EN 12843:2004**

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**ICS:**

| | | |
|---|---|---|
| 91.100.30 | Beton in betonski izdelki | Concrete and concrete products |

**SIST EN 12843:2004** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 12843

September 2004

ICS 91.100.30; 29.240.20

English version

# Precast concrete products - Masts and poles

Produits préfabriqués en béton - Mâts et poteaux

Betonfertigteile - Maste

This European Standard was approved by CEN on 24 June 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, 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**



Ref. No. EN 12843:2004: E

# Contents

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

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# Foreword

This document (EN 12843:2004) 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 March 2005, and conflicting national standards shall be withdrawn at the latest by June 2006.

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 Construction Products Directive(89/106/EEC) of European Union (EU)..

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 an 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 of several parts :

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

— prEN 12794, *Precast concrete products - Foundation piles*

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

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

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

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

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

— prEN 13978, *Precast concrete products – Precast concrete garages*

— prEN 14843, *Precast concrete products - Stairs*

— prEN 14844, *Precast concrete products – Box culverts*

— prEN 14991, *Precast concrete products – Foundation elements*

— prEN 14992, *Precast concrete products – Wall elements: Products properties and performances*

— prEN 15037, *Precast concrete products – Beams for beam-and-block floor systems*

This standard defines in Annex ZA the application methods of CE marking to products designed using the relevant EN Eurocodes (EN 1992-1-1 and EN 1992-1-2). 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## Introduction

Products covered by the present standard are structural units mainly designed to resist relevant actions resulting from their specific use.

It is in line with the relevant general requirements (EN 1992-1-1 and EN 1992-1-2, EN 13369, EN 206-1, prEN 50423:2004).

It gives, where applicable, requirements related to ambient condition and exposure classes for concrete covers.

In general EN 1991 1-1, Eurocode 1, Actions on structures is applicable for actions, but specific uses may require additional information (e.g. wind turbines, overhead electrical lines, overhead electrical lines for railways, trams and similar).

In Clauses 4.3.3 and 4.3.8 this standard includes specific provisions resulting from the application of EN 1992-1-1 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.

# 1 Scope

This document specifies requirements for precast concrete poles (also commonly called masts) (either all of a piece or composed of elements), reinforced and/or prestressed as structural elements; they may be hollow or solid and may receive or include additional components (e.g. cross-arms, platforms etc.), inserts and connectors. Additional elements may be connected to pole elements.

Structures made from such elements in mono- or multi-legged form may be used for :

— overhead electrical lines ;

— telecommunication lines ;

— overhead electrical lines for railways, trams and similar ;

— supports for lighting ;

— supports for loudspeaker installation ;

— antenna and telecommunication poles ;

— supports for wind turbines ;

— and similar installations.



This document does not cover lighting columns for use in traffic circulation areas.



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

EN 12390-5, *Testing hardened concrete – Part 5 : Flexural strength of test specimens*.

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

# 3 Terms and definitions

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

**3.1**
**pole (or mast)**
upright slender structure fixed rigidly at the foot

**3.2**
**foot**
lower end of a pole

**3.3**
**top**
upper end of a pole

**3.4**
**pole length**
length from foot to top

**3.5**
**embedment length**
length of the pole segment firmly fixed in the surrounding of earth or foundation

**3.6**
**specific complementary provision**
provision valid in the place of use, such as client's order, or national (non conflicting) complementary standard, specific to a product covered by the present standard

**3.7**
**shock concrete**
concrete compacted by mechanical shock, e.g. by using excentric shafts to lift and drop casting table

**3.8**
**spun concrete**
concrete compacted by pressure and vibration using a rotating mould (centrifugal force)



**3.9**
**vacuum concrete**
concrete exposed to a vacuum, (so the enclosed air and some water are driven to the surface and sucked away, when relieving the vacuum, the air pressure compacts the concrete)



**3.10**
**vibrated concrete**
concrete compacted by vibrators which may be internal, external or other surface types

**3.11**
**pole straightness**
maximum allowable deviation of the pole with respect to a line along its total length

## 4 Requirements

### 4.1 Material requirements

#### 4.1.1 General

For general aspects, constituent materials of concrete, reinforcing and prestressing steel, inserts and connectors, the relevant clauses of EN 13369:2004, Clause 4.1 shall apply. In particular the ultimate tensile and tensile yield strength of steel shall be considered.

NOTE The missing numbers correspond to the clauses of EN 13369 included in the general references made in this subchapter.

#### 4.1.5 Inserts and connectors

Where applicable inserts and connectors shall comply with complementary requirements, valid in the place of use of the poles.

## 4.2 Production requirements

The production of concrete shall comply with EN 13369:2004, Clause 4.2, except for the concrete strength classes (4.2.2.1) that shall be at least C 30/37 for reinforced poles and C 35/45 for prestressed poles; provisions valid in the place of use may require higher values. In particular the compressive strength of concrete shall be considered.

## 4.3 Finished product requirements

NOTE The missing numbers correspond to the clauses of EN 13369:2004 which are not relevant for the purposes of this standard.

### 4.3.1 Geometrical properties

Product dimensions shall be defined on the basis of the specific design and calculations. Complementary provisions can be given or referred to in the client's order.

#### 4.3.1.1 Production tolerances

Table 1 shall apply for production tolerances. More stringent values may be required. Dimensions shall be measured in accordance with 5.2.2.

**Table 1 — Permitted deviations related to work dimension**



| Parameter | Permitted deviations |
|---|---|
| Pole length | ± 1 % with a maximum of 100 mm |
| Crossectional outer dimensions | + 10 % -5 % with a maximum of + 20 mm and of – 15 mm |
| Pole straightness (where applicable) | ± 0.3 % of the total length of the unit |
| Pole mass | + 10 % – 5 % of the nominal mass |



### 4.3.2 Surface characteristics

When determined according to Clause 5.2.1, the surface of the pole shall be free from damage that may adversely affect its structural integrity or reduce its durability.

In the absence of special provisions, blemishes or surface irregularities are admissible, but shall be limited to :

— diameter ≤ 25 mm ;

— depth ≤ 5 mm providing the cover is not reduced below the minimum values in 4.3.7.1.

The maximum crack width in the cement rich layer caused by shrinkage or temperature shall not exceed 0,2 mm.

Finishing of the surface is acceptable providing that the requirements of this document are not adversely affected.

### 4.3.3 Mechanical resistance

Bearing capacity is defined following 4.3.3 of EN 13369:2004. Specific complementary provisions on the actions applied on the pole may be specified by the user/authorities, e.g. :

— permanent actions ;

— variable actions ;

— accidental actions ;

— other actions (e.g. manipulation, transport, dynamic effects).

Where specific complementary provisions define two (or more) loads in relation to each axis of symmetry and corresponding requirements, these shall include at least two from the following requirements :

— a flexural load with its permissible deformation ;

— ultimate flexural load, or its serviceability limit load ;

— ultimate torsional load, and their compliance criteria.

Mechanical resistance shall be verified either by calculation or by calculation aided by testing.

For calculation, 4.3.3.2 of EN 13369:2004 shall be applied.

For calculation aided by testing, 4.3.3.3 of EN 13369:2004 and 5.5 of this document shall be applied. For the first verification by testing of a calculation method for precise production conditions, using a defined type of concrete and steel, five tests, as described in 5.5 and covering the range of design stress of the products sections, shall be performed. Where this calculation method is applied to two plants or more, with the same production conditions, complementary verification tests covering the stress range shall be performed on three poles of the yet untested production.



#### 4.3.4 Resistance and reaction to fire



#### 4.3.4.4 Reaction to fire

Clause 4.3.4.4 of EN 13369:2004 shall apply

#### 4.3.7 Durability

For general aspects, surface integrity, steel corrosion resistance, freeze-thaw and water absorption, the relevant Clauses 4.3.7 of EN 13369:2004 shall apply.

#### 4.3.7.4 Concrete cover

Concrete cover shall be according to class A or to class B.

Class A corresponds to the application of Annex B of the present document, it may be used for products with a design working life not exceeding 30 years and when a specific larger cover is not required by the client.

Class B corresponds to the application of clause 4.3.7.4 of EN 13369:2004, it shall be used for a longer design working life or when required by the client.

#### 4.3.8 Detailing

For specific applications, the clauses hereafter may be replaced by relevant clauses of EN 1992-1-1: 2004 and the product marked accordingly.