SLOVENSKI STANDARD
SIST EN 13230-4:2009

01-september-2009

Nadomeġ ļa:
SIST EN 13230-4:2004

Ģelezniġke naprave - Zgornji ustroj - Betonski pragi in kretniġki betonski pragi - 4. del: Prednapeti betonski pragi za kretnice in kriġiġļ a

Railway applications - Track - Concrete sleepers and bearers - Part 4: Prestressed bearers for switches and crossings

Bahnanwendungen - Oberbau - Gleis- und Weichenschwellen aus Beton - Teil 4 : Spannbetonschwellen für Weichen und Kreuzungen

Applications ferroviaires - Voie - Traverses et supports en béton - Partie 4 : Supports précontraints pour appareil de voie

Ta slovenski standard je istoveten z: **EN 13230-4:2009**

ICS:

45.080	Traļ nice in ģelezniġki deli	Rails and railway components
91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 13230-4:2009 **en,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13230-4

June 2009

ICS 91.100.30; 93.100

Supersedes EN 13230-4:2002

English Version

Railway applications - Track - Concrete sleepers and bearers - Part 4: Prestressed bearers for switches and crossings

Applications ferroviaires - Voie - Traverses et supports en béton - Partie 4 : Supports précontraints pour appareil de voie

Bahnanwendungen - Oberbau - Gleis- und Weichenschwellen aus Beton - Teil 4: Spannbetonschwellen für Weichen und Kreuzungen

This European Standard was approved by CEN on 14 May 2009.

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, 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

Ref. No. EN 13230-4:2009: E

Contents

Page

Foreword

This document (EN 13230-4:2009) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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 December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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 document supersedes EN 13230-4:2002.

This European Standard is one of the series EN 13230 "Railway applications – Track – Concrete sleepers and bearers", which consist of the following parts:

— Part 1: General requirements

— Part 2: Prestressed monoblock sleepers

— Part 3: Twin-block reinforced sleepers

— Part 4: Prestressed bearers for switches and crossings

— Part 5: Special elements

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 EC Directive 2008/57/EC.

For relationship with EC Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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, 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

This part of EN 13230 defines the specific requirements dedicated to prestressed bearers for switches and crossings.

These are additional requirements to EN 13230-1:2009 and are necessary to have a complete standard dealing with prestressed concrete bearers for switches and crossings.

The document specifies the test arrangements and the test procedures to implement and also the corresponding acceptance criteria just as the design approval test.

1 Scope

This part of EN 13230 defines additional technical criteria and control procedures as well as specific tolerance limits related to designing and manufacturing prestressed bearers for switches and crossings with a maximum length of 8,5 m.

Bearers longer than 8,5 m are considered as special elements and shall comply with EN 13230-5.

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 206-1, *Concrete – Part 1: Specification, performance, production and conformity*

EN 13230-1:2009, *Railway applications – Track – Concrete sleepers and bearers – Part 1: General requirements*

EN 13230-5:2009, *Railway applications – Track – Concrete sleepers and bearers – Part 5: Special elements*

3 Terms and definitions

For the purposes of this part of EN 13230, the terms and definitions given in EN 13230-1:2009 and the following apply:

3.1
prestressed monoblock bearer
bearer manufactured using pre-tensioned or post-tensioned tendons

4 Special requirement

4.1 Design bending moments

The bearer shall be designed with positive and negative design bending moment capacities with the objective of keeping it straight.

4.2 Positioning of fastening components

An area of the concrete section shall be specified by the purchaser to be free from prestressing tendons for the location of fastening components.

If required by the purchaser, the design of the bearer shall provide for the repair or replacement of the embedded fastening components.

4.3 Tolerances

4.3.1 General

The maximum tolerances specified in EN 13230-1:2009, 6.1 apply to concrete bearers.

Measurement of tolerances shall be checked not before 48 h after transfer of prestressing forces.

4.3.2 Tolerance of planeness

The maximum deviation of the total rail seat or base plate area is as follows:

— planeness: 1 mm;

- Variation of planeness with regard to 2 points 150 mm apart: 0,5 mm

4.3.3 Tolerances of fastening positioning

The tolerances of the embedded fastening components positioning shall be measured in accordance with Figure 1.

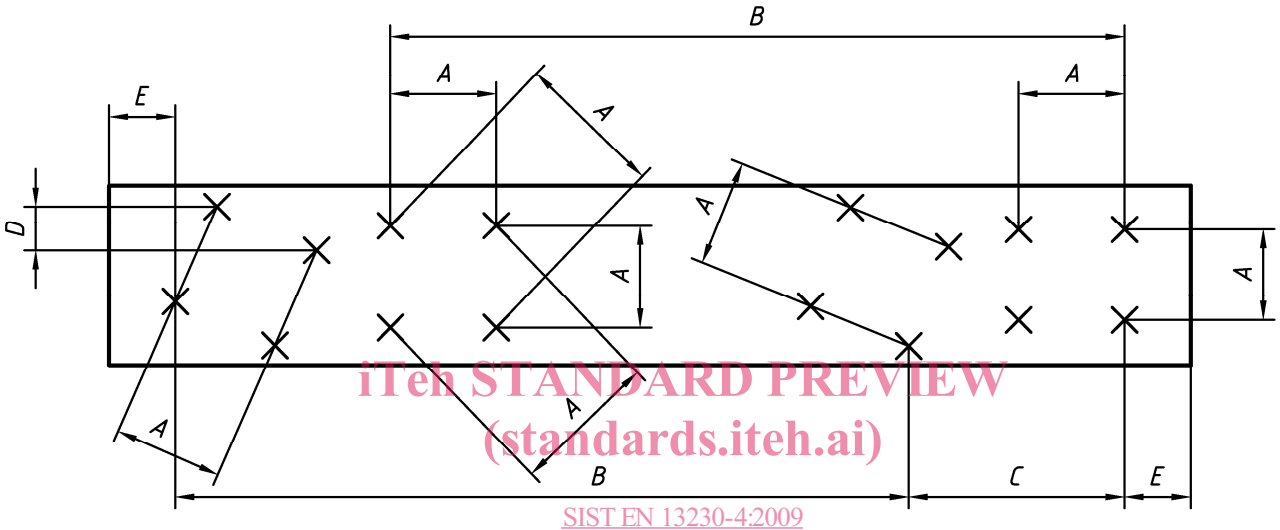


Figure 1 — Measurement of tolerances on fastening components positioning

Tolerance on dimensions *A* and *D* (on the same support area): ± 1,0 mm

Tolerance on dimensions *B* and *C* (between two separate supports areas): ± 1,5 mm

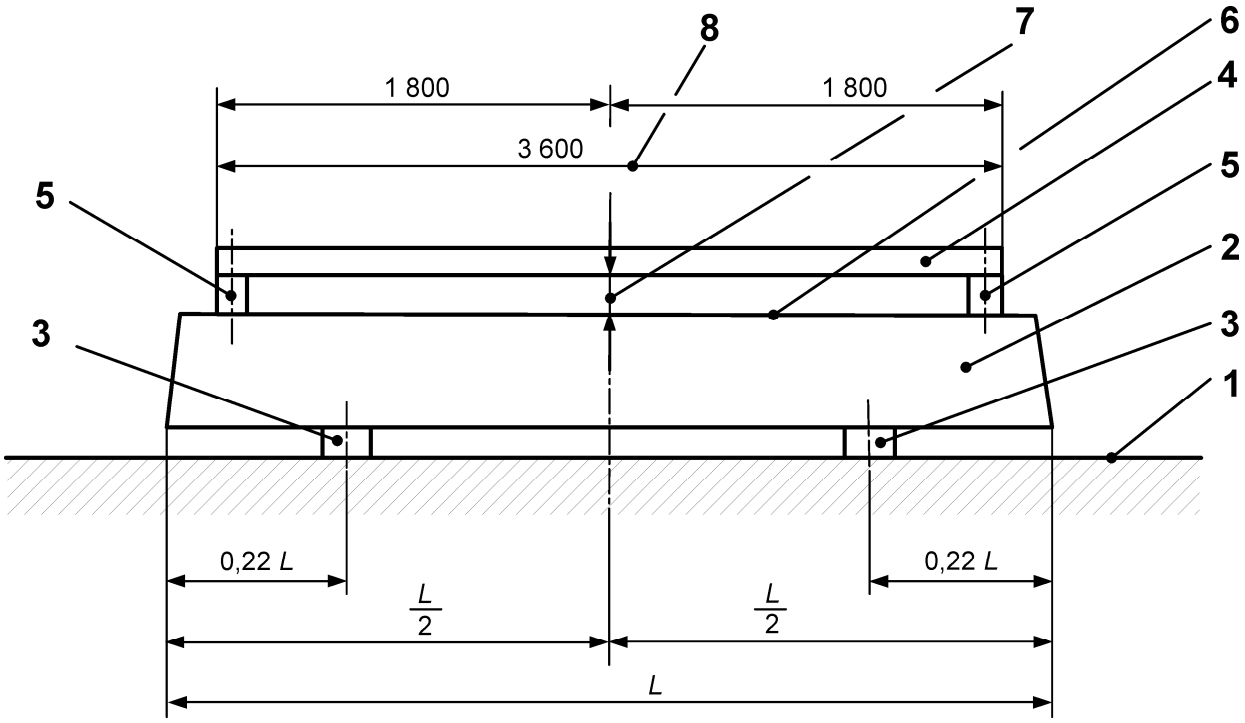
Tolerance between the last cast-in component and the end of the bearer (*E*): ± 10 mm

The tolerances specified above may be varied by the purchaser in case of special requirements and shall be defined on the drawings submitted by the purchaser.

These tolerances shall apply to all embedded components with either direct or indirect fastening system.

4.3.4 Tolerance of vertical deviation from straight

Figure 2 shows the vertical deviation measurement.



Key

1 Rigid support
2 Bearer
3 Support (50 mm × 50 mm section) across width of bearer
4 Straight datum
5 Support across width of bearer
6 Top surface of bearer
7 Vertical deviation measurement area
8 Measurement base

Figure 2 — Vertical deviation measurement

Vertical deviation in both directions is measured on a 3,6 m long base as on Figure 2.

Alternative measurement methods can be proposed by the manufacturer and agreed with the purchaser.

Bearers shorter than 4 m need not be checked.

Maximum allowed deviation is 3 mm on a 3,6 m base.

For bearer length above 6 m, maximum allowed deviation is agreed between supplier and purchaser.

4.4 Distance from the end of the bearer to the nearest cast-in component

The supplier defines the prestress anchoring area and special care to be taken into account for cast-in components near to the end of the bearer.

5 Product testing

5.1 General

This section defines the testing regime and rules for acceptance of concrete bearers.

The layouts of the test arrangements are defined in this section.

5.2 Symbols

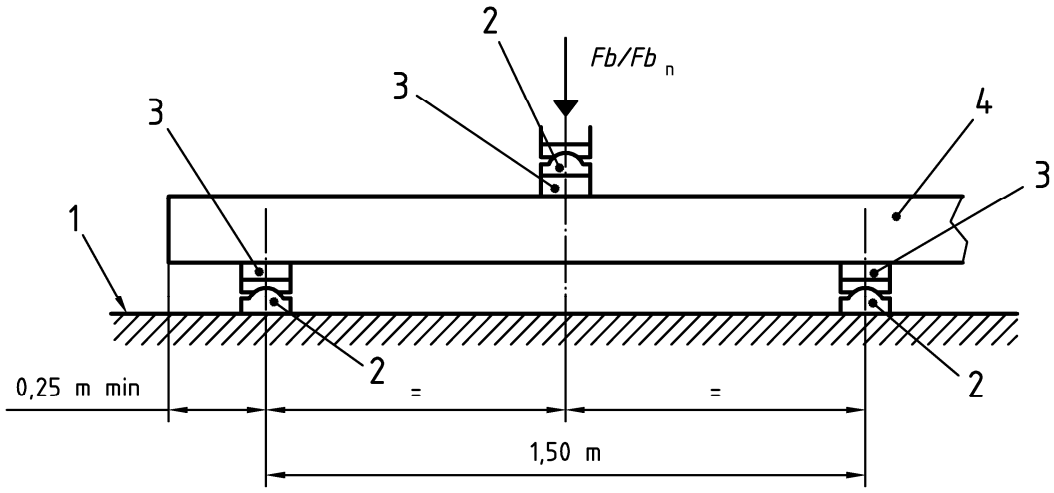
The following symbols are used as defined in Table 1:

Table 1 — Symbols

Symbol	Designation
M	Positive design bending moment, in kNm
Mn	Negative design bending moment, in kNm
Fb_0	Positive initial reference test load, in kN
Fb_{0n}	Negative initial reference test load, in kN
Fb_r	Test load which produces first crack at the bottom of the bearer, in kN
Fb_{rn}	Test load which produces first crack at the top of the bearer, in kN
$Fb_{0,05}$	Maximum test load for which a crack width of 0,05 mm persists at the bottom of the bearer after removal of the load, in kN
$Fb_{0,05n}$	Maximum test load for which a crack width of 0,05 mm persists at the top of the bearer after removal of the load, in kN
Fb_B	Maximum test load which cannot be increased when the bottom of the bearer is cracked, in kN;
Fb_{Bn}	Maximum test load which cannot be increased when the top of the bearer is cracked, in kN
Fb_u	Lower test load for the fatigue test: $Fb_u = 0{,}25 \times Fb_0$, in kN
k_b	Impact coefficient for positive static test
k_{bn}	Impact coefficient for negative static test
k_{bB}	Impact coefficient for fatigue test

5.3 Test arrangements

The arrangement for the static and fatigue test is shown in Figure 3.



Key

1 Rigid support
2 Articulated support (see Annex A for details)
3 Resilient pad (see Annex A for details)
4 Bearer

Figure 3 — Test arrangement

For the static test, the bearer shall be arranged as in Figure 3.

For the fatigue test, the load Fb shall be applied at the centre section of the bearer.

5.4 Test procedures

5.4.1 Test loads

Fb_0 and Fb_{0n} is calculated from the geometry given in Figure 3 using the following equations:

$$Fb_0 = \frac{M}{0{,}35} \text{ in kN;} \quad (1)$$

$$Fb_{0n} = \frac{Mn}{0{,}35} \text{ in kN} \quad (2)$$

5.4.2 Static test

The static test procedure is shown in Figures 4 and 5 for the positive and negative bending moments.

The maximum load applied is $Fb_{0,05}$ or Fb_B whichever is reached first.