SLOVENSKI STANDARD
SIST EN 13230-2:2004

01-marec-2004

Železniške naprave – Zgornji ustroj – Betonski pragi in kretniški betonski pragi – 2. del: Enodelni prednapeti betonski pragi

Railway applications - Track - Concrete sleepers and bearers - Part 2: Prestressed monoblock sleepers

Bahnanwendungen - Oberbau - Gleis- und Weichenschwellen aus Beton - Teil 2: Spannbeton-Monoblockschwellen

Applications ferroviaires - Voie - Traverses et supports en béton - Partie 2: Traverses monoblocs précontraintes

Ta slovenski standard je istoveten z: **EN 13230-2:2002**

ICS:

45.080	Tračnice in železniški deli	Rails and railway components
91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 13230-2:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13230-2

December 2002

ICS 45.080

English version

Railway applications - Track - Concrete sleepers and bearers - Part 2: Prestressed monoblock sleepers

Applications ferroviaires - Voie - Traverses et supports en béton - Partie 2: Traverses monoblocs précontraintes

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This European Standard was approved by CEN on 9 October 2002.

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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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Ref. No. EN 13230-2:2002 E

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Foreword

This document EN 13230-2:2002 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of an identical text or by endorsement, at the latest by June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

This European Standard is one of the series EN 13230 "Railway applications -Track — Concrete sleepers and bearers" which consists of the following parts:

— Part 1: *General requirements*;

— Part 2: *Prestressed monobloc sleepers*;

— Part 3: *Twin-block reinforced sleepers*;

— Part 4: *Prestressed bearers for switches and crossings*;

— Part 5: *Special elements*.

Annexe A is normative.

This document contains bibliographical references.

No other European Standard is superseded or replaced by this European 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This part of this European Standard defines the specific requirements relating to prestressed monobloc sleepers.

These are additional requirements to EN 13230-1 and are necessary to have a complete standard dealing with prestressed monobloc sleepers.

1 Scope

This part of this European Standard defines additional technical criteria and control procedures related to the design and manufacture of prestressed monobloc sleepers.

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, *Concrete – Part 1: Performance, production and conformity.*

EN 13230-1:2002, *Railway applications - Track – Concrete sleepers and bearers – Part 1: General requirements.*

3 Definitions

For the purpose of this standard, the definitions in EN 13230-1:2002 and the following definitions apply:

3.1
pretensioned monobloc sleeper
sleeper manufactured using pre-tensioned tendons

3.2
post-tensioned monobloc sleeper
sleeper manufactured using post-tensioned tendons

4 Product testing

4.1 Test arrangements

The test arrangements for the rail seat section and centre section tests are defined in this clause.

4.1.1 Symbols

The following symbols are used:

Fr_0 initial reference test load for the rail seat section, in kN;

Fr_r test load which produces first crack formation at the bottom of the rail seat section, in kN;

$Fr_{0,05}$ test load for which a crack width of 0,05 mm at the bottom of the rail seat section persists after removal of the load, in kN;

$Fr_{0,5}$ test load for which a crack width of 0,5 mm at the bottom of the rail seat section persists after removal of the load, in kN;

Fr_B test load at the rail seat section which cannot be increased, in kN;

F_u lower test load for the rail seat section dynamic test ; Fr_u = 50 kN;

Fc_0 positive initial reference test load at the centre section of the sleeper, in kN;

Fc_{0n} negative initial reference test load at the centre section of the sleeper, in kN;

Fc_r positive test load which produces first crack formation at the centre of the sleeper, in kN;

Fc_{rn} negative test load which produces first crack formation at the centre of the sleeper, in kN;

Fc_B positive test load at the centre section which cannot be increased, in kN;

Fc_{Bn} negative test load at the centre section which cannot be increased, in kN;

L_p design distance between the centre line of the rail seat to the edge of the sleeper at the bottom, in m;

L_r design distance between the articulated support centre lines for the test arrangement at the rail seat section, in m;

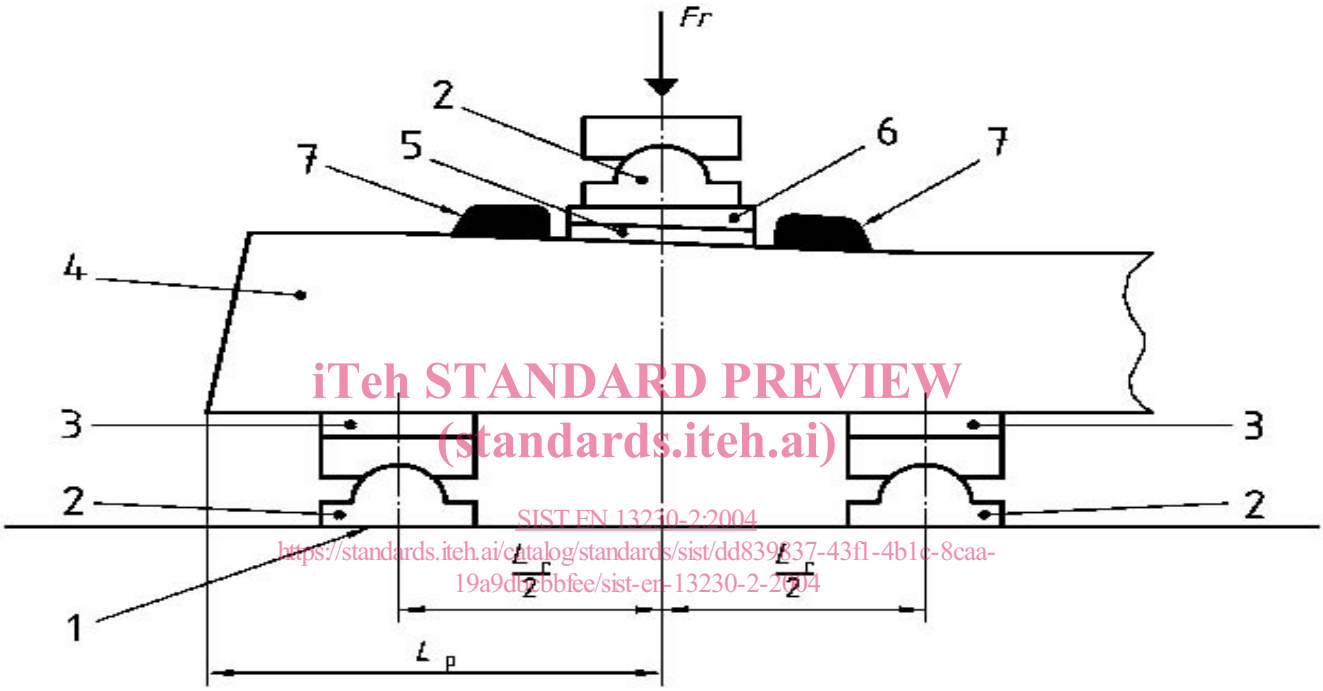
L_c design distance between centre lines of the rail seat, in m.

4.1.2 Rail seat section

The arrangement for the rail seat positive load test is shown in Figure 1.

The load *Fr* is applied perpendicularly to the base of the sleeper.

The end of the sleeper opposite to the end being tested shall be unsupported.



Key

1 Rigid support
2 Articulated support (see annex A for details)
3 Resilient pad (see annex A for details)
4 Prestressed monobloc sleeper
5 Standard rail pad as defined by the purchaser
6 Tapered packing (see annex A for details)
7 Lateral stop

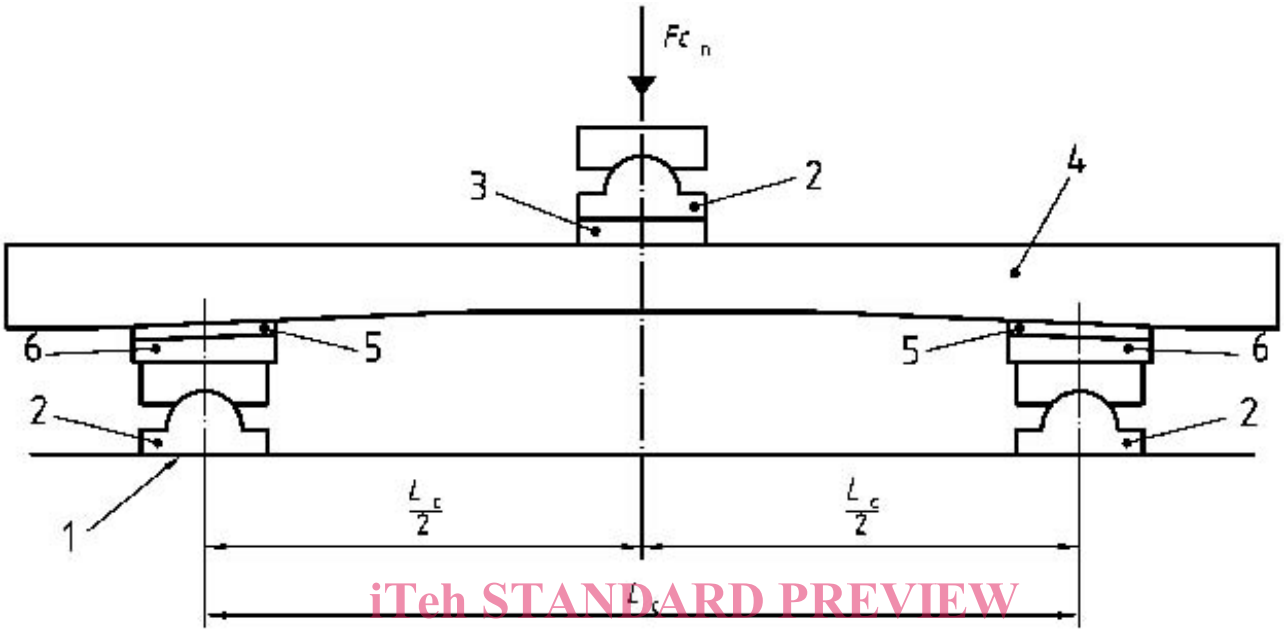
Figure 1 — Test arrangement at the rail seat section for the positive load test

Table 1 — Value of L_r in relation to L_p

L_p in m	L_r in m
$L_p < 0{,}349$	0,3
$0{,}350 \leq L_p < 0{,}399$	0,4
$0{,}400 \leq L_p < 0{,}449$	0,5
$L_p \geq 0{,}450$	0,6

4.1.3 Centre section

The arrangement for the negative centre load test is shown in Figure 2.1

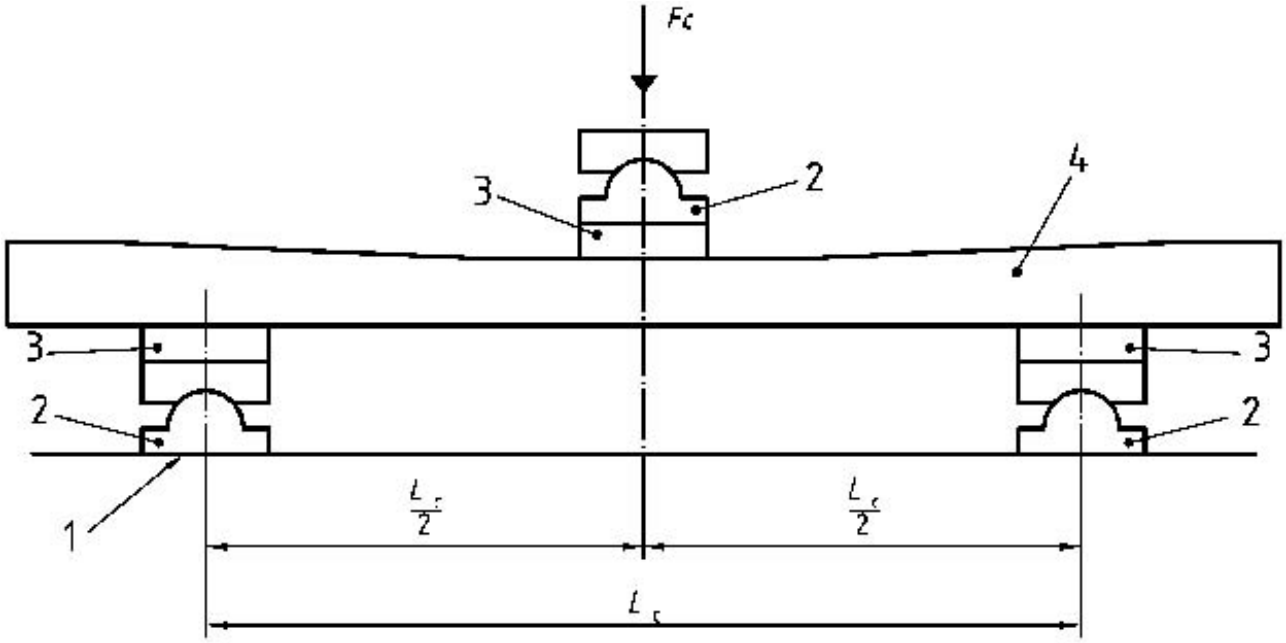


Key

1 Rigid support
2 Articulated support (see annex A for details)
3 Resilient pad (see annex A for details)
4 Prestressed monobloc sleeper
5 Standard rail pad as defined by the purchaser
6 Tapered packing (see annex A for details)

Figure 2.1 — Test arrangement at the centre section for the negative load test

The test arrangement for the positive centre load test is shown in Figure 2.2



Key

1 Rigid support
2 Articulated support (see annex A for details)
3 Resilient pad (see annex A for details)
4 Prestressed monobloc sleeper

Figure 2.2 — Test arrangement at the centre section for the positive load test

4.2 Test procedures

4.2.1 Test loads

Fr_0 is calculated from the geometry given in Figure 1 and values from Table 2 using the following equation:

$$Fr_0 = \frac{4\,Mdr}{L_r - 0{,}1} \text{ in kN.}$$

Table 2 — Value of Fr_0 in relation to L_r

L_r in m	0,3	0,4	0,5	0,6
Fr_0 in kN	20 *Mdr*	13 *Mdr*	10 *Mdr*	8 *Mdr*

Fc_0 *and* Fc_{0n} are calculated from the geometry given in Figures 2.1 and 2.2 using the following equations:

$$Fc_0 = \frac{4\,Mdc}{L_c - 0{,}1} \text{ in kN;} \qquad Fc_{0n} = \frac{4\,Mdc_n}{L_c - 0{,}1} \text{ in kN.}$$

For the definitions of *Mdr* and *Mdc :* see EN 13230-1:2002 - clause 3.