SLOVENSKI STANDARD
SIST EN 13230-1:2016

01-julij-2016

Nadomešča:
SIST EN 13230-1:2009

Železniške naprave - Zgornji ustroj proge - Betonski pragi in kretniški betonski pragi - 1. del: Splošne zahteve

Railway applications - Track - Concrete sleepers and bearers - Part 1: General requirements

Bahnanwendungen - Oberbau - Gleis- und Weichenschwellen aus Beton - Teil 1: Allgemeine Anforderungen

Applications ferroviaires - Voie - Traverses et supports en béton - Partie 1 : Prescriptions générales

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Full standard:
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ICS:

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

SIST EN 13230-1:2016 **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 91.100.30; 93.100

Supersedes EN 13230-1:2009

English Version

Railway applications - Track - Concrete sleepers and bearers - Part 1: General requirements

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This European Standard was approved by CEN on 4 March 2016.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 13230-1:2016) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This document supersedes EN 13230-1:2009.

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of an identical text or by endorsement, at the latest by November 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

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 EU Directive 2008/57/EC.

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

This European Standard is one of the EN 13230 series "*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;

— Part 6: Design.

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This European Standard is used as the technical basis for transaction between corresponding parties (purchaser – supplier).

Annexes A to F are informative; they can be used as normative requirements by completion of a contract, if agreed by the contracting parties.

The Annex E of EN 13230-1:2009 is deleted and is shifted into EN 13230-6.

There is a change in the wording of the documents of EN 13230 (series) "design bending moment" is replaced by "characteristic bending moment" and "test bending moment".

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This part of the EN 13230 series covers the general requirements for concrete sleepers and bearers and is used in conjunction with the following parts:

— Part 2: Prestressed monoblock sleepers;

— Part 3: Twin-block reinforced sleepers;

— Part 4: Prestressed bearers for switches and crossings;

— Part 5: Special elements;

— Part 6: Design.

Concrete sleepers and bearers are safety critical components for railway applications. They are not covered by any other standards.

As safety critical components, an agreement is needed between purchaser and supplier to operate a factory Quality System.

This position about safety critical relevance has always been highlighted by decisions from CEN/TC 256/SC 1 "*Railway applications / Infrastructure*" and Annex ZA provides detailed information.

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1 Scope

This part of the EN 13230 series defines technical criteria and control procedures which need to be satisfied by the constituent materials and the finished concrete sleepers and bearers, i.e.: precast concrete sleepers, twin-block reinforced sleepers, bearers for switches and crossings, and special elements for railway tracks.

The main requirement of concrete sleepers and bearers is the transmission of vertical, lateral and longitudinal loads from the rails to the ballast or other support. In use, they are also exposed to frost damage and to moisture, which can result in detrimental chemical reactions within the sleeper.

In this standard mechanical tests are defined which provide assurance of the capability of sleepers or bearers to resist repetitive loading and provide sufficient durability. In addition, controls are placed on manufacturing processes and tests to ensure that the concrete will not suffer degradation in service through chemical reaction and frost damage.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 206, *Concrete - Specification, performance, production and conformity*

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EN 934-2, *Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling*

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EN 1008, *Mixing water for concrete - Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*

EN 10080, *Steel for the reinforcement of concrete - Weldable reinforcing steel - General*

FprEN 10138 (all parts), *Prestressing steels*

EN 12620, *Aggregates for concrete*

EN 13146-5, *Railway applications - Track - Test methods for fastening systems - Part 5: Determination of electrical resistance*

EN 13230-2:2016, *Railway applications – Track – Concrete sleepers and bearers – Part 2: Prestressed monobloc sleepers*

EN 13230-3:2016, *Railway applications – Track – Concrete sleepers and bearers – Part 3: Twin-block reinforced sleepers*

EN 13230-4:2016, *Railway applications – Track – Concrete sleepers and bearers – Part 4: Prestressed bearers for switches and crossings*

prEN 13230-6:2015, *Railway applications – Track – Concrete sleepers and bearers – Part 6: Design*

EN 13481-2, *Railway applications - Track - Performance requirements for fastening systems - Part 2: Fastening systems for concrete sleepers*

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EN 13481-5, *Railway applications - Track - Performance requirements for fastening systems - Part 5: Fastening systems for slab track with rail on the surface or rail embedded in a channel*

EN 13481-7, *Railway applications - Track - Performance requirements for fastening systems - Part 7: Special fastening systems for switches and crossings and check rails*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
purchaser
body responsible for purchasing the product on the user's behalf

3.2
supplier
body responsible for the use of the European Standard in response to the purchaser's requirement, and for requirements which apply to the producer or manufacturer

3.3
sleeper
transverse component of the track which controls the gauge and transmits loads from the rail to the ballast or other sleeper support

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3.4
bearer for switches and crossings
transverse component of switches and crossings which controls the relative geometry of two or more stretches of running rails and different pieces of special track work, and transmits loads from the rails to the ballast or other bearer support

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3.5
bending moment
moment applied on the concrete sleeper or bearer which produces tension and compression in the element

3.6
positive bending moment
moment which produces tension or reduces compression at the bottom of the concrete sleeper or bearer

3.7
negative bending moment
moment which produces tension or reduces compression at the top of the concrete sleeper or bearer

3.8
rail seat
area on which a running rail rests

3.9
rail seat area
rail seat and the immediate area around the fastening system

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3.10
rail seat bending moment
moment under the centre line of the rail

3.11
centre bending moment
moment at the centre part of a monoblock sleeper

3.12
prestressed monoblock sleeper
monoblock sleeper using pre-tensioned or post-tensioned tendons for prestressing the concrete

3.13
twin-block reinforced sleeper
sleeper in which two reinforced concrete blocks are connected by a steel connecting bar

3.14
prestressed concrete bearer
monoblock bearer using pre-tensioned or post-tensioned tendons for prestressing the concrete

3.15
test load
load applied during testing

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3.16
crack
partial split in concrete due to an external bending moment

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3.17
crack under loading
crack measured during a test with an external bending moment applied

3.18
residual crack
crack measured during a test after an external bending moment has been applied and has been removed

3.19
minimum concrete cover
minimum cover given by the nominal cover reduced by the tolerance

Note 1 to entry: Construction tolerances do not apply to the anchorage system of prestressed sleepers, in which case only the ordinary construction tolerances indicated by the manufacturer are applied.

3.20
dynamic rail seat load
P_k
characteristic load on a rail seat of the sleeper for normal service dynamic loading

3.21
characteristic bending moment
M_k
bending moment from dynamic rail seat load P_k

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3.22
characteristic positive bending moment for rail seat section
$M_{k,r,pos}$
positive bending moment at rail seat from dynamic rail seat load P_k

3.23
characteristic negative bending moment for rail seat section
$M_{k,r,neg}$
negative bending moment at rail seat from dynamic rail seat load P_k

3.24
characteristic negative bending moment for centre section
$M_{k,c,neg}$
negative bending moment at centre section from dynamic rail seat load P_k

3.25
characteristic positive bending moment for centre section
$M_{k,c,pos}$
positive bending moment at centre section from dynamic rail seat load P_k

4 Common characteristics

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4.1 General

The track is an assembly of transverse sleepers or bearers secured to the rails by means of a fastening system and supported by ballast or other support. It is characterized by the gauge of the track, the rail profile, the inclination of the rails and the spacing of the concrete sleepers and bearers.

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4.2 Loading

4.2.1 Loads

The track is subjected to repeated loads in three different directions, generally applied simultaneously:

a) vertical loads from axle load and service conditions;

b) transverse loads from guiding forces;

c) longitudinal loads from acceleration and braking, thermal stresses in continuous welded rail, etc.

Under all loading conditions, the track has to retain its geometry including gauge, top level and alignment.

The characteristic load is calculated by applying a dynamic coefficient to the static wheel load.

The dynamic coefficient takes into account the normal dynamic effects of wheel and track irregularities.

Loads and the corresponding bending moments are the responsibility of the purchaser.

4.2.2 Load distribution

The assembled rail, fastening system and concrete sleepers and bearers on ballast or other support shall be considered as a beam on a continuous resilient support.