

RAUDTEEALASED RAKENDUSED. RÖÖBASTEE.
BETOONLIIPRID JA -PRUSSID. OSA 1: ÜLDNÕUDED

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13230-1:2016 sisaldab Euroopa standardi EN 13230-1:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 13230-1:2016 consists of the English text of the European standard EN 13230-1:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 11.05.2016.	Date of Availability of the European standard is 11.05.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.100.30, 93.100

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN 13230-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2016

ICS 91.100.30; 93.100

Supersedes EN 13230-1:2009

English Version

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

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

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

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

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

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	5
Introduction	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	8
4 Common characteristics	10
4.1 General.....	10
4.2 Loading.....	10
4.2.1 Loads.....	10
4.2.2 Load distribution.....	10
4.3 Characteristic bending moments	11
4.4 Data to be supplied.....	11
4.4.1 General.....	11
4.4.2 Data to be supplied by the purchaser	11
4.4.3 Data to be provided by the supplier.....	12
5 Materials.....	12
5.1 General requirements	12
5.2 Cement	13
5.3 Aggregates	13
5.4 Mixing water	14
5.5 Admixtures	14
5.6 Concrete.....	14
5.6.1 Material requirements.....	14
5.6.2 Information to be provided by the supplier.....	14
5.6.3 Changes for the material and processes	15
5.7 Steel.....	15
5.7.1 Prestressing tendons	15
5.7.2 Reinforcing steel.....	15
5.7.3 Steel connecting bar	15
5.8 Embedded components.....	15
6 General requirements	15
6.1 Design.....	15
6.1.1 Geometrical design.....	15
6.1.2 Concrete cover.....	18
6.1.3 Prestressing system design	18
6.1.4 Reinforcing steel design	18
6.2 Manufacturing process.....	18
6.2.1 General requirements	18
6.2.2 Natural curing.....	19
6.2.3 Accelerated curing.....	19
6.3 Surface finish	21
6.4 Marking.....	21
7 Product testing.....	21

7.1	General	21
7.2	Mechanical parameters	22
7.3	Tests on product	22
7.4	Tests on concrete	22
7.5	Tests in combination with the fastening system	23
7.6	Additional tests	23
8	Quality control	23
8.1	General	23
8.2	Quality control during design approval tests	24
8.3	Quality control during manufacturing	24
Annex A (informative) Test method to determine the Taber Wear index for a fine aggregate		25
A.1	General	25
A.2	Apparatus	25
A.3	Preparation of Mortar Tiles	25
A.3.1	Sampling	25
A.3.2	Mortar Tile preparation	25
A.3.3	Mortar Tile curing	26
A.3.4	Grinding of Mortar Tiles	26
A.4	Test procedure	26
A.5	Calculation of Taber Wear Index	26
Annex B (informative) Test method for freeze–thaw resistance		27
Annex C (informative) Test method for measuring the water absorption of concrete at atmospheric pressure		28
C.1	Introduction	28
C.2	Samples	28
C.3	Sequence of test	28
C.4	Results	28
C.5	Requirements	28
Annex D (informative) Definition and recommendation for measurement of rail seat inclination and twist between rail seats		29
Annex E (informative) Surface finish		30
E.1	General	30
E.2	General information for surface finish	30
E.3	Surface finish of the rail seat	30
E.4	Surface finish of all other surfaces	31
E.5	Detailed procedure for remedial work	31
Annex F (informative) Quality control during manufacturing – Routine tests and frequency of testing		32
F.1	General	32
F.2	Data of the sleeper to be checked	32

F.3	Examples for frequency of testing.....	34
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC.....	35
Bibliography.....		37

This document is a preview generated by EVS

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.

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.

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.

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*

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

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*

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

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

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