

# SVENSK STANDARD

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### **Järnvägar – Spår – Betongsliprar – Del 2: Förspänd armerad enblockssliper**

### **Railway applications – Track – Concrete sleepers and bearers – Part 2: Prestressed monoblock sleepers**

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Denna standard ersätter SS-EN 13230-2, utgåva 1.

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This standard supersedes the Swedish Standard SS-EN 13230-2, edition 1.

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13230-2**

June 2009

ICS 91.100.30; 93.100

Supersedes EN 13230-2:2002

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

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

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

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## Foreword

This document (EN 13230-2:2009) 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of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.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 13230-2:2002.

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 monoblock sleepers.

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



## 1 Scope

This part of EN 13230 defines additional technical criteria and control procedures related to designing and manufacturing prestressed monoblock sleepers.

## 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*

## 3 Terms and definitions

For the purposes of this part 2 of EN 13230, the terms and definitions given in EN 13230-1:2009 and the following apply:

### 3.1

#### **pretensioned monoblock sleeper**

sleeper manufactured using pre-tensioned tendons

### 3.2

#### **post-tensioned monoblock sleeper**

sleeper manufactured using post-tensioned tendons

## 4 Product testing

### 4.1 General

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

### 4.2 Test arrangements

#### 4.2.1 Symbols

The symbols used in this European Standard are listed in Table 1.

**Table 1 — Symbols**

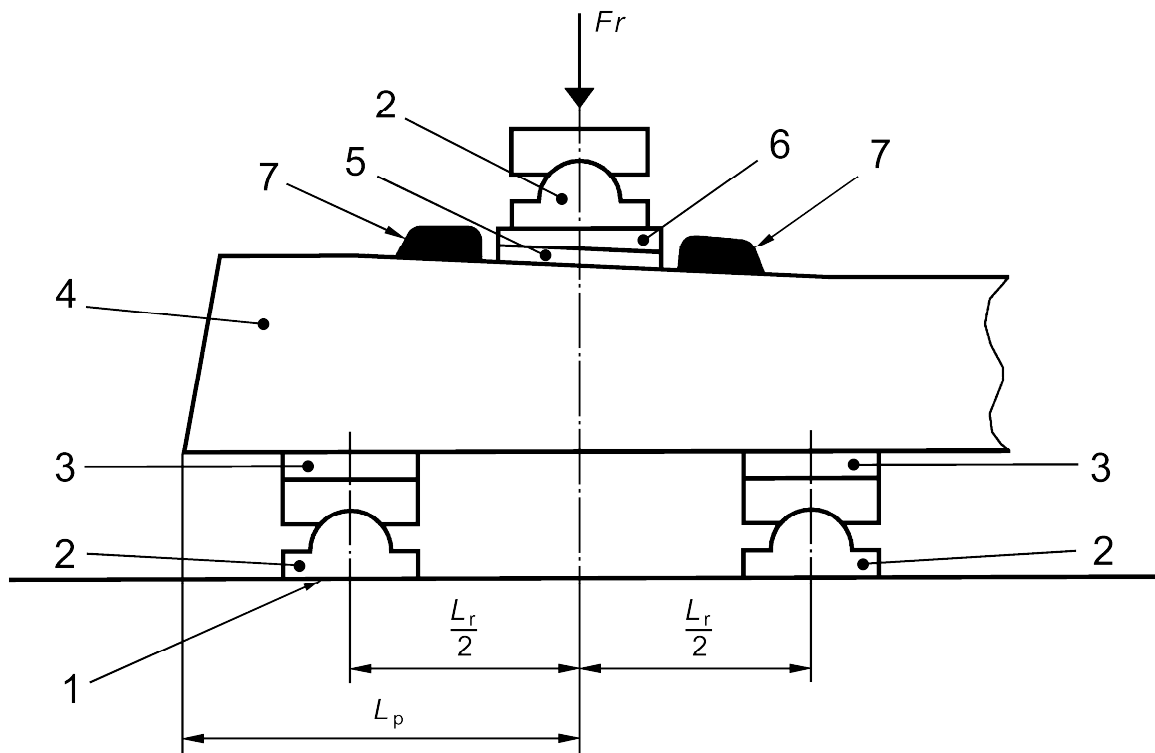
Symbol	Designation
$Fr_0$	Positive initial reference test load for the rail seat section in kN
$Fr_r$	Positive test load which produces first crack formation at the bottom of the rail seat section in kN
$Fr_{0,05}$	Maximum test load for which a crack width of 0,05 mm at the bottom of rail seat section persists after removal of the load in kN
$Fr_{0,5}$	Maximum 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
$Fr_B$	Maximum positive test load at the rail seat section which cannot be increased in kN
$Fr_u$	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
$Fc_m$	Negative test load which produces first crack formation at the centre of the sleeper in kN
$Fc_B$	Maximum positive test load at the centre section which cannot be increased in kN
$Fc_{Bn}$	Maximum 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 supports 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
$Mdr$	Positive design bending moment at rail seat, in kNm
$Mdc_n$	Negative design bending moment at centre section, in kNm
$k_{1s}$	Static coefficient to be used for calculation of $Fr_{0,05}$ test load
$k_{2s}$	Static coefficient to be used for calculation of $Fr_{0,5}$ or $Fr_B$ test load
$k_{1d}$	Dynamic coefficient to be used for calculation of $Fr_{0,05}$ test load
$k_{2d}$	Dynamic coefficient to be used for calculation of $Fr_{0,5}$ or $Fr_B$ test load
$k_3$	Static coefficient to be used for calculation of $Fr_B$ at the end of fatigue test

#### 4.2.2 Rail seat section

The arrangement for the rail seat positive load test is shown in Figure 1, the value of  $L_r$  in relation to  $L_p$  is detailed in Table 2.

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 monoblock sleeper
- 5 Standard rail pad as defined by the purchaser
- 6 Tapered packing (see Annex A for details)
- 7 Lateral stop and base plate, only when required by the purchaser

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

**Table 2 — 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