SLOVENSKI STANDARD
SIST EN 13146-7:2004

01-marec-2004

Železniške naprave – Zgornji ustroj – Preskušanje pritrdilnih sistemov – 7. del: Ugotavljanje pritisne sile vzmeti

Railway applications - Track - Test methods for fastening systems - Part 7: Determination of clamping force

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 7: Bestimmung der Spannkraft

Applications ferroviaires - Disques de frein pour matériel ferroviaire - Partie 1: Disques de frein calés ou frettés sur essieu ou sur arbre moteur, exigences de dimensions et de qualité

Ta slovenski standard je istoveten z: **EN 13146-7:2002**

ICS:

93.100	Gradnja železnic	Construction of railways

SIST EN 13146-7:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13146-7

October 2002

ICS 93.100

English version

Railway applications - Track - Test methods for fastening systems - Part 7: Determination of clamping force

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 7: Détermination de l'effort d'application au patin du rail

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 7: Bestimmung der Spannkraft

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

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 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 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.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 13146-7:2002 E

Contents

Foreword

This document (EN 13146-7:2002) 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 April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

This document has been prepared under mandates (M/024[1]), M/275[2])) given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

This series of European Standards EN 13146 "Railway applications — Track — Test methods for fastening systems" consists of the following Parts:

— *Part 1 : Determination of longitudinal rail restraint.*

— *Part 2 : Determination of torsional resistance.*

— *Part 3 : Determination of attenuation of impact loads.*

— *Part 4 : Effect of repeated loading.*

— *Part 5 : Determination of electrical resistance.*

— *Part 6 : Effect of severe environmental conditions.*

— *Part 7 : Determination of clamping force.*

— *Part 8 : In service testing.*

These support the requirements in the series EN 13481 Railway applications — Track — Performance requirements for fastening systems — Parts 1 to 7.

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.

---

[1]) Railway equipment.

[2]) Standardization in the field of Railway Equipment on the Interoperability of the Trans-European High-Speed Rail System.

1 Scope

This Part of this European Standard specifies laboratory test procedures for measuring the clamping force exerted by the fastening system on the foot of a rail. It is applicable to systems with and without baseplates on all types of sleepers, bearers and elements of slab track.

These test procedures apply to a complete fastening assembly.

A reference procedure and an alternative procedure are included.

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 13481-1:2002, *Railway applications — Track — Performance requirements for fastening systems — Part : 1 Definitions.*

3 Terms and definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13481-1:2002 apply.

3.2 Symbols and abbreviations

For the purposes of this European Standard, the following symbols apply.

d	vertical displacement of the sleeper relative to the rail, in mm;
m_s	mass of sleeper or part sleeper and fastening components fixed to it, used in the test, in kg;
m_f	mass of loading frame supported by the sleeper, in kg;
P	vertical load applied to the sleeper, in kN;
P_0	vertical load at zero rail displacement which just counteracts the clamping force, in kN.

4 Principle

The clamping force for a complete rail fastening assembly is determined by measuring the force necessary to separate the rail from the surface on which it is supported.

5 Apparatus

5.1 Rail

A short length (approximately 0,5 m) of rail, of the section for which the fastening assembly under test is designed. The rail shall be unlaminated and have no loose rust on the surface nor be polished on the foot by repeated testing.

5.2 Loading device

A device to apply a vertical load at a controlled rate of approximately 10 kN/min. For the reference procedure the load is applied to the rail and for the alternative procedure the load is applied to a loading frame supported on the sleeper.

5.3 Load displacement measuring and recording instruments

Instruments which measure the vertical displacement of the rail support (baseplate or sleeper) relative to the rail. The recording instruments shall be capable of plotting load-displacement diagrams.

5.4 Calibration

The calibration of actuators and measuring instruments shall be verified with equipment having certified traceability to European or International Standards using the International System of Units (SI).

5.5 Steel shims

Steel shims 25 mm x 25 mm x 0,25 mm, maximum thickness 0,30 mm.

6 Test specimens

6.1 Sleeper, bearer or concrete block

A portion of a sleeper, bearer or concrete block whose centroid is approximately at the centre line of the rail seat or baseplate support area. This is described as a sleeper in the test procedure.

6.2 Fastening components

All fastening components, as used in track, including baseplates where incorporated.

7 Reference procedure

7.1 Preparation for test

Fix the rail to the sleeper, with the baseplate if part of the assembly, using the fastening components assembled as in track.

NOTE If a rail pad is used which is shaped to provide positive location in the assembly, the edges of the pad can be cut off to simplify removal of the pad as described in 7.2. The portion of the pad under the rail should not be cut.

Clamp the portion of sleeper to the base of the test fixture. Set up the test arrangement as shown in Figure 1 to permit a load P to be applied to the rail normal to the rail seat. Locate one displacement transducer at each of the four corners of the rail seat to measure d. Zero the displacement transducers.

7.2 Loading and measurement for assemblies incorporating a rail pad

Apply an increasing tensile load P to the rail, ensuring that the rail base is kept parallel to the rail seat, until the pad can just be moved. Remove the pad and decrease the load until the average of the displacement transducers is zero. Record the load P and then reduce the load to approximately 0,9P. Whilst recording d (the average of the four transducers) increase the load P at a rate not exceeding 10 kN/min until the load is 1,1P. From the load-displacement diagram (see Figure 2) read off the value of P_0 at d = 0 which is taken as the clamping force. Repeat the procedure twice more and calculate the mean clamping force.

7.3 Loading and measurement for assemblies not incorporating a rail pad

Apply an increasing tensile load P to the rail until there is a clear space under the rail which is just sufficient to allow insertion of four steel shims under the rail, one at each corner of the railseat. Reduce the load P to zero and then reapply an increasing load until a value is reached at which it is just possible to move all the shims by hand. This load is P_0 which is taken as the clamping force. Repeat the procedure twice more and calculate the mean clamping force.

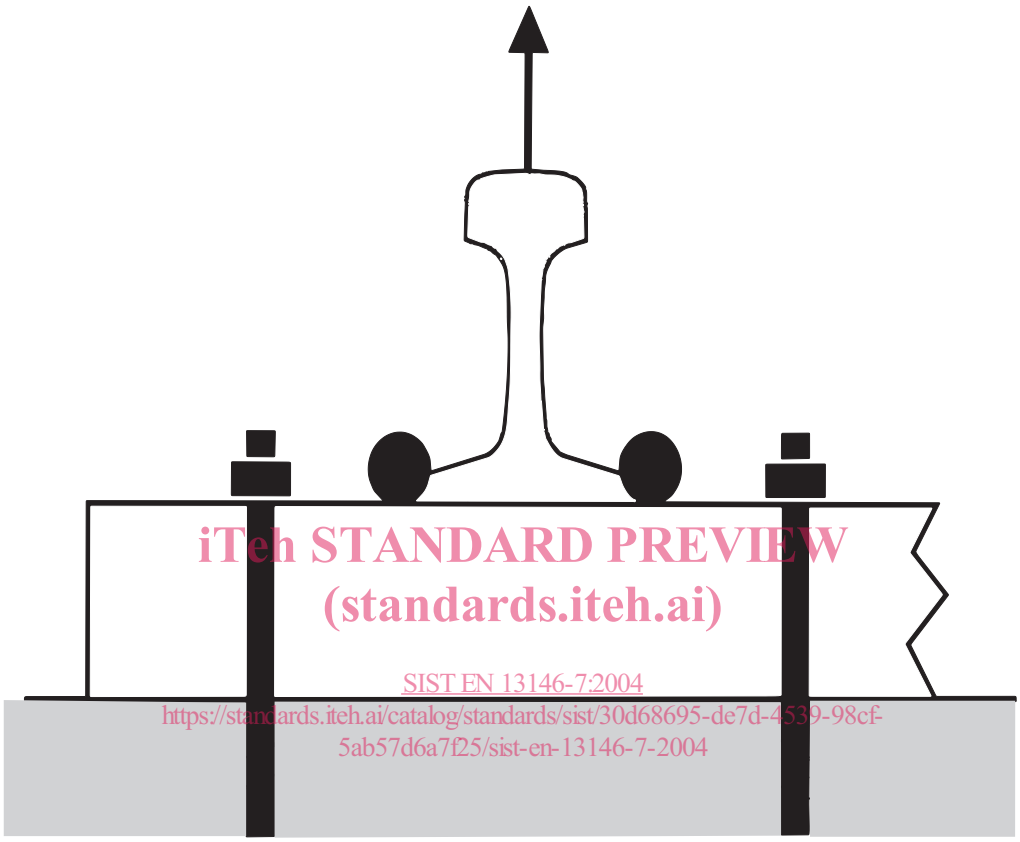
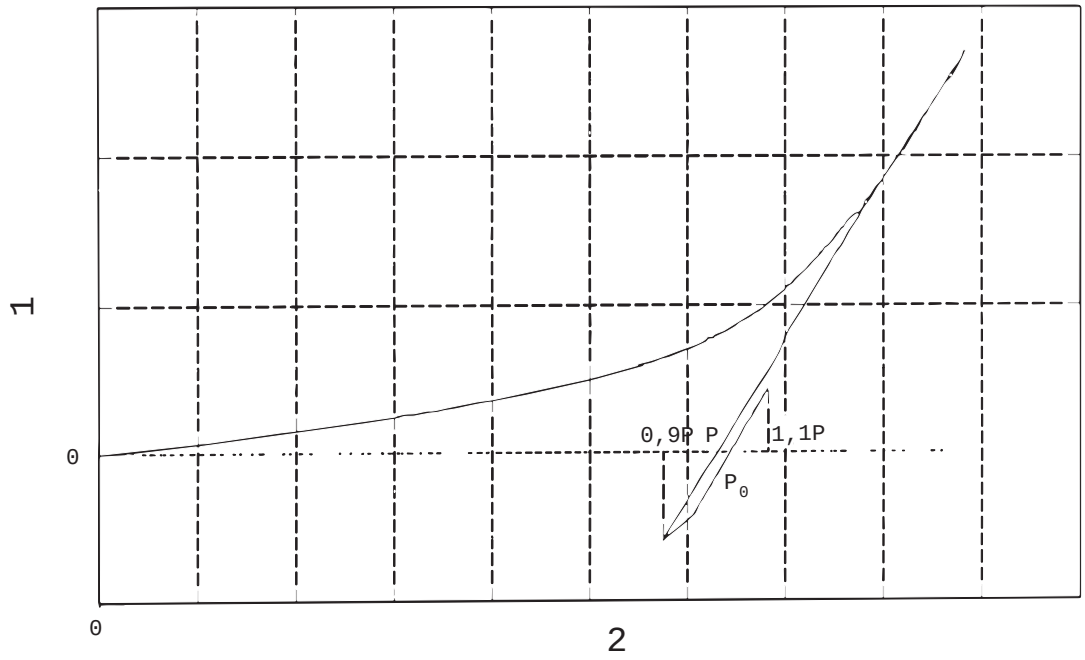


Figure 1 — Test arrangement for reference procedure



Key
1 Displacement *d*, mm
2 Load *P*, kN

Figure 2 — Load-displacement diagram