

Railway applications - Track - Test methods for fastening systems - Part 4: Effect of repeated loading

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13146-4:2012+A1:2014 sisaldab Euroopa standardi EN 13146-4:2012+A1:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 13146-4:2012+A1:2014 consists of the English text of the European standard EN 13146-4:2012+A1:2014.
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 05.11.2014.	Date of Availability of the European standard is 05.11.2014.
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 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; 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; www.evs.ee; phone 605 5050; e-mail info@evs.ee

English Version

Railway applications - Track - Test methods for fastening systems - Part 4: Effect of repeated loading

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 4: Effets produits par des charges répétitives

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 4: Dauerschwingversuch

This European Standard was approved by CEN on 26 November 2011 and includes Amendment 1 approved by CEN on 25 September 2014.

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

Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions, symbols and abbreviations	5
3.1 Terms and definitions	5
3.2 Symbols and abbreviations	5
4 Principle	6
5 Apparatus	6
5.1 Rail	6
5.2 Actuator	6
5.3 Load application head	6
5.4 Displacement measuring instruments	6
5.5 Force measuring instruments	6
5.6 Verification of calibration	7
6 Test specimens	7
6.1 Sleeper or other rail support	7
6.2 Fastening	7
7 Procedure for one rail	7
7.1 General	7
7.2 Preparation for test	8
7.2.1 In line fastening	8
7.2.2 Offset fastening	8
7.3 Clamping force	8
7.4 Longitudinal rail restraint	8
7.5 Vertical static stiffness of fastening assembly	8
7.6 Cyclic loading	9
7.7 Repeat tests	12
7.8 Final inspection	12
8 Alternative test procedure	12
8.1 General	12
8.2 Apparatus	12
8.2.1 General	12
8.2.2 Loading frame	12
8.3 Procedure	13
8.3.1 General	13
8.3.2 Preparation for test	13
8.3.3 Clamping force	14
8.3.4 Longitudinal rail restraint	14
8.3.5 Vertical stiffness	14
8.3.6 Cyclic loading	14
8.3.7 Repeat tests	14
8.3.8 Final inspection	14
9 Test report	14

Foreword

This document (EN 13146-4:2012+A1:2014) 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 May 2015, and conflicting national standards shall be withdrawn at the latest by May 2015.

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 A1 EN 13146-4:2002 A1.

This document includes Amendment 1 approved by CEN on 2014-09-25.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

In this revision of EN 13146-4:2002 the procedure has been modified for application to embedded rail.

This European Standard is one of the series EN 13146 "*Railway applications — Track — Test methods for fastening systems*" which 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;*
- *Part 9: Determination of stiffness.*

These support the requirements in the series EN 13481 "*Railway applications — Track — Performance requirements for fastening systems*".

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, 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.

1 Scope

This European Standard specifies a laboratory test procedure for applying repeated displacement cycles representative of the displacements caused by traffic on railway track. It is used for assessing the long term performance of direct fastening systems.

The procedure is applicable to surface mounted rail on sleepers, bearers and slab track, and embedded rail.

This test procedure applies to a complete fastening assembly.

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.

[A1] EN 13146-1:2012+A1:2014 [A1], *Railway applications — Track — Test methods for fastening systems — Part 1: Determination of longitudinal rail restraint*

EN 13146-7:2012, *Railway applications — Track — Test methods for fastening systems — Part 7: Determination of clamping force*

EN 13146-9:2009, *Railway applications — Track — Test methods for fastening systems — Part 9: Determination of stiffness*

EN 13481-1:2012, *Railway applications — Track — Performance requirements for fastening systems — Part 1: Definitions*

EN 13481-2:2012, *Railway applications — Track — Performance requirements for fastening systems — Part 2: Fastening systems for concrete sleepers*

EN 13481-3:2012, *Railway applications — Track — Performance requirements for fastening systems — Part 3: Fastening systems for wood sleepers*

EN 13481-4:2012, *Railway applications — Track — Performance requirements for fastening systems — Part 4: Fastening systems for steel sleepers*

EN 13481-5:2012, *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 13481-7:2012, *Railway applications — Track — Performance requirements for fastening systems — Part 7: Special fastening systems for switches and crossings and check rails*

EN ISO 7500-1:2004, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

EN ISO 9513:2002, *Metallic materials — Calibration of extensometers used in uniaxial testing (ISO 9513:1999)*