SLOVENSKI STANDARD
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Železniške naprave - Zgornji ustroj - Preskušanje pritrdilnih sistemov - 2. del: Ugotavljanje torzijskega odpora

Railway applications - Track - Test methods for fastening systems - Part 2: Determination of torsional resistance

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 2: Ermittlung des Verdrehwiderstandes

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 2: Détermination du couple d'encastrement

Ta slovenski standard je istoveten z: **EN 13146-2:2012**

ICS:

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Railway applications - Track - Test methods for fastening systems - Part 2: Determination of torsional resistance

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 2: Détermination du couple d'encastrement

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 2: Ermittlung des Verdrehwiderstandes

This European Standard was approved by CEN on 26 November 2011.

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Foreword

This document (EN 13146-2:2012) 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of an identical text or by endorsement, at the latest by October 2012, and conflicting national standards shall be withdrawn at the latest by October 2012.

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 13146-2:2002.

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

Detailed changes only have been made in this revision of EN 13146-2:2002. The procedure is not applicable 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, 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 to determine the moment necessary to rotate a rail, secured to a sleeper by a rail fastening assembly, through 1° in a plane parallel to the base of the rail. The value obtained can be used in track stability calculations.

The test is not applicable to embedded rails.

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.

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

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)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13481-1:2012 apply.

4 Principle

A transverse load is applied to the foot of a rail fixed to a single rail seat of a sleeper whilst the sleeper is restrained. Movement of the rail relative to the sleeper is recorded and the load increased until the rail has rotated through a minimum of 1,5°. The moment to cause a displacement of 1° is then determined from a plot of moment of load against displacement.

5 Apparatus

5.1 Rail

A short length of rail of the section for which the fastening assembly under test is designed. The rail shall be unlaminated and have neither loose rust on the surface nor be polished on the foot by repeated testing.

5.2 Actuator

Actuator capable of applying a force, of at least 25 kN, to the edge of the foot of the rail, normal to the rail and parallel to the plane of the foot of the rail, at a controlled rate of (2 ± 1) kN/min as shown in Figure 1.

5.3 Displacement measuring instruments

The instruments shall be capable of measuring the displacement of the rail relative to its support to ± 0,1°.

If linear measurement of displacement is used contact instruments shall conform to EN ISO 9513:2002, Table 2, Class 2 and be capable of measuring displacement to ± 0,01 mm.

5.4 Force measuring instruments

Instruments conforming to EN ISO 7500-1:2004, class 1 over the required range of force.

5.5 Verification of calibration

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

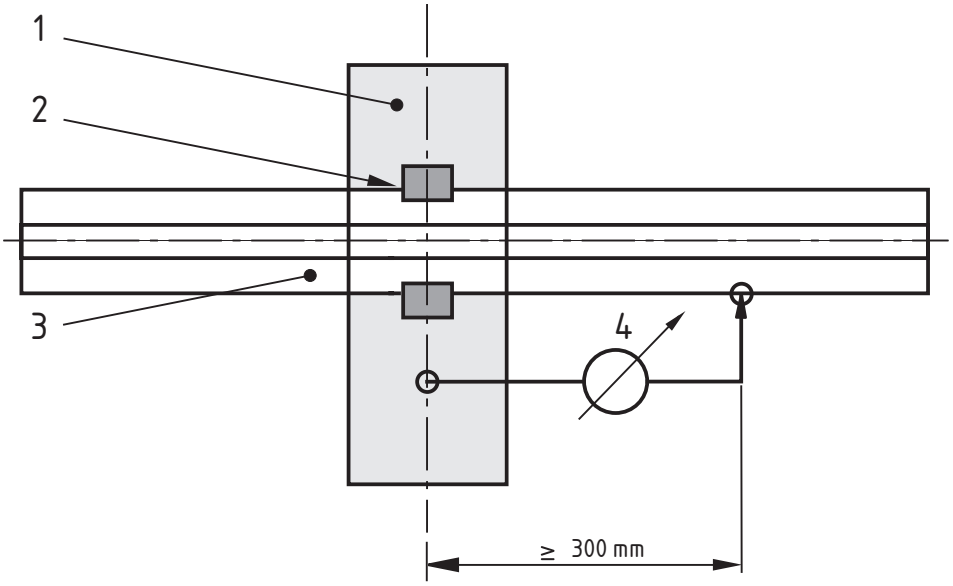
6 Test specimens

6.1 Rail support

A sleeper or half sleeper with cast-in fastening components or holes and rail seats, as made without modification for this test.

6.2 Fastening

The complete fastening assembly including all components and baseplate, where appropriate.



Key

1 test rail support
2 fastening assembly including pad
3 rail as described in 5.1
4 displacement measuring instrument

Figure 1 — Test arrangement with in-line fastenings

7 Procedure

7.1 Preparation for test

Fix the short length of rail to one rail seat of the rail support using the fastening components as assembled in track. Support the sleeper on a rigid horizontal base and restrain it from horizontal movement.

7.2 Loading and measurement with fastenings in line

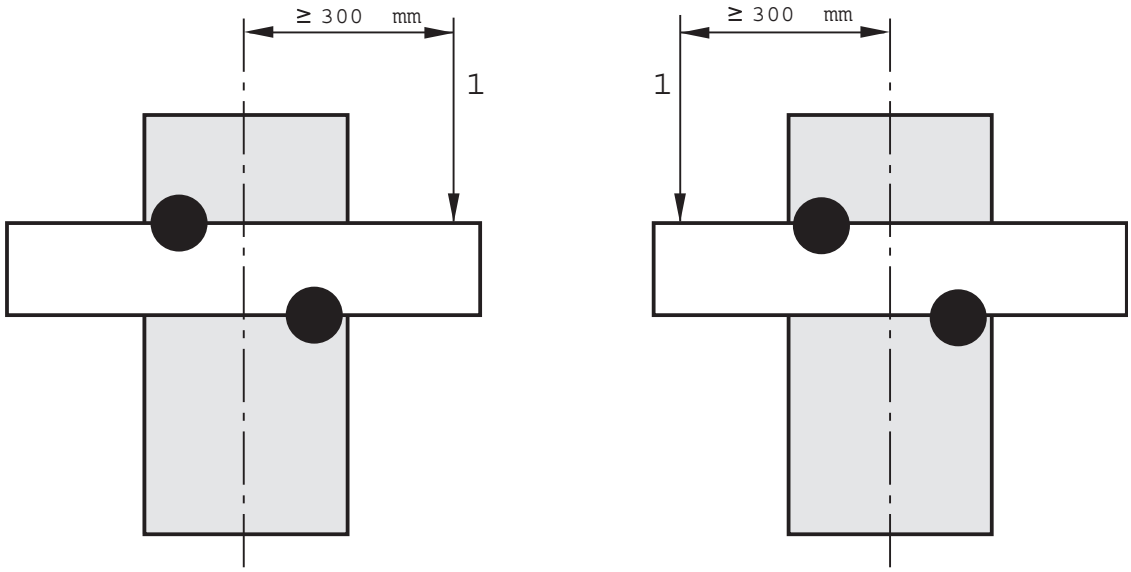
Using the arrangement shown in Figure 1, apply a load to the rail and push the rail to a position where the rail foot in the rail seat area diagonally contacts both fastening inserts or insulators or shoulders. Move the actuator to the opposite side of the rail. Apply an increasing load and continuously measure and record the moment of load to ± 0,03 kNm and the rail displacement relative to the sleeper to ± 0,01°. When the rail has displaced by a minimum of 1,5, remove the load. After a minimum of 3 min apply the load to the opposite side of the rail and repeat the same loading cycle.

Plot the moment of load against the angular displacement of the rail for each loading cycle.

NOTE To avoid damage to the fastening assembly, loading should be stopped as soon as the rail contacts both fastening inserts or insulators or shoulders.

7.3 Loading and measurement when fastenings offset

If the fastenings are offset from the rail support centre line, perform two tests on the same assembly with each arrangement shown in Figure 2. Plot the moment of load against the angular displacement of the rail for each loading cycle.



Key

1 load

Figure 2 — Test arrangement with offset fastenings

7.4 Moment of load-displacement graph

A typical moment of load-displacement graph is shown in Annex A. The data for track stability can be extracted from such graphs.

8 Test report

The test report shall include at least the following information:

a) number, title and date of issue of this European Standard;

b) name and address of laboratory performing the test;

c) date test performed;

d) name, designation and description of fastening assembly, including individual components, tested;

e) origin of test specimens;

f) rail section used in test;

g) test arrangement;

h) graphs of moment of load versus rail angle for each direction of loading.