SLOVENSKI STANDARD
SIST EN 13146-10:2017

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Železniške naprave - Zgornji ustroj - Preskušanje pritrdilnih sistemov - 10. del: Obremenitveni preskus odpornosti "pull-out"

Railway applications - Track - Test methods for fastening systems - Part 10: Proof load test for pull-out resistance

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 10: Belastungsprüfungen für den Auszugswiderstand

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 10 : Essai de charge d'épreuve pour la résistance à l'arrachement

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ICS:

93.100	Gradnja železnic	Construction of railways

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Railway applications - Track - Test methods for fastening systems - Part 10: Proof load test for pull-out resistance

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword

This document (EN 13146-10:2017) 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of an identical text or by endorsement, at the latest by July 2017 and conflicting national standards shall be withdrawn at the latest by July 2017.

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

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*

— *Part 10: Proof load test for pull-out resistance*

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies a test procedure to confirm that the force necessary to pull the anchorage of a rail fastening assembly out of the sleeper or other supporting element is greater than a prescribed value (i.e. it is a 'proof load' test).

This test is for components of the fastening system which are:

a) cast into concrete during the manufacture of sleepers or other supporting elements;

b) glued into the cast or drilled holes in concrete; or

c) screwed or otherwise attached to wood, plastic or steel sleepers or other supporting elements.

This test is not applicable to embedded rails.

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, *Railway applications — Track — Performance requirements for fastening systems — Part 1: Definitions*

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

3 Terms and definitions

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

4 Principle

A vertical upward force is applied to the anchored fastening element, directly above the point at which it is cast, glued or screwed into its support. The load is increased until the prescribed 'proof load' is reached. There should be no evidence of any damage which might reduce the strength or durability of the fastening system.

NOTE For general applications, values of proof load are given in EN 13481–2 (for concrete sleepers) and EN 13481–5 (for slab tracks).

5 Apparatus

5.1 Actuator

An actuator capable of applying an upward force of at least 75 kN to the component of the fastening system which is attached to the sleeper or supporting element. A linkage shall be provided between the actuator and the fastening component which ensures that the vertical force is applied directly above the part of the component which is anchored to the sleeper or support without applying unrepresentative flexural or torsional moments to any component.

5.2 Force measuring instruments

Force measuring instruments conforming to EN ISO 7500-1 class 2 over the required range of force.

6 Test specimens

6.1 Rail support

For sleepers or bearers, the test specimen shall consist of a sleeper or half sleeper (or bearer) with cast-in or glued-in fastening components or holes and rail seats as made without modification for this test.

For applications in non-ballasted track where sleepers are not used, a representative section of the support (e.g. a concrete block) shall be used which has a depth equal to the depth of the proposed supporting element or equal to the embedded length of the insert plus 15 mm, whichever is less. In plan view, the support used in the test may be of any shape but it shall extend at least 150 mm from the centre line of the insert in all directions. If a concrete block is used, it shall have a cube strength not greater than the cube strength of the concrete specified for application in the track and it shall not contain steel reinforcing elements close to the fastening unless they are present in the application in the track. If it does contain steel reinforcing, there shall be at least 15 mm of concrete covering the steel.

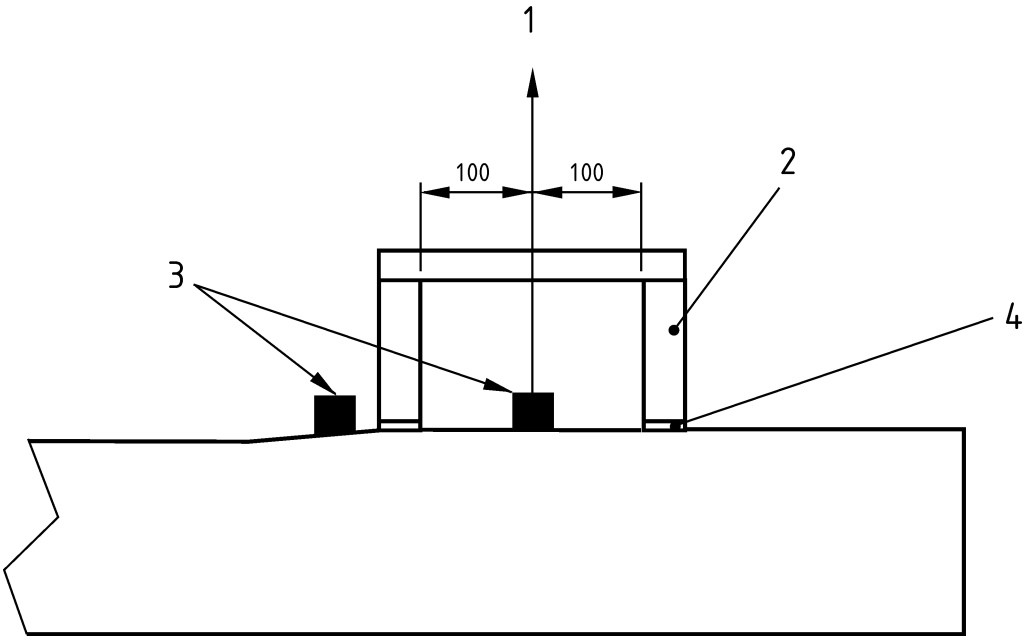
6.2 Fastening components

The test specimen shall consist of a fastening component which is anchored to the sleeper or support as made and without modification for the test.

For inserts intended to receive a screw, the load shall be applied to the insert through a screw from the fastening system, inserted to the design depth. For fastening systems in which the design depth varies according to the amount of height adjustment used, the test shall be carried out in the adjustment condition which gives the smallest embedded length. For cast-in components intended to house a clip, the load shall be applied through the feature that retains the clip.

It is not necessary to assemble any other elements of the rail fastening system for this test.

Dimensions in millimetres



Key

1 load centre line
2 support for load
3 fastening inserts
4 layer of suitable conformable material (e.g. plywood or low density polyethylene (LDPE))

Figure 1 — Test arrangement

7 Procedure

7.1 Preparation for test

Ensure that the sleeper, bearer or supporting element is supported in a stable manner on a generally level surface and assemble the loading mechanism on top of it.

7.2 Loading and measurement of force

The loading arrangement is shown in Figure 1. The distance between the line of action of the applied force and the inner edge of the supports shall be (100 ± 5) mm. If the load support coincides with a projecting insert position, the support shall be modified to bear the load symmetrically each side of the insert and retain the (100 ± 5) mm dimension. The load shall be applied to the fastening insert at a rate of (50 ± 10) kN/min until the prescribed proof load is reached. The load shall be maintained for 3 min and then removed without shock. In general, the load shall be applied normal to the rail seat. If the insert is inclined, the load may be applied parallel to its longitudinal axis.

7.3 Inspection

After the test, the sleeper or supporting element shall be inspected to determine whether there is any evidence of damage to the fastening component or the sleeper or supporting element that could result in a loss of integrity or durability of the system.

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 the laboratory performing the test;

c) date when test performed;

d) description of the test specimens. For attachments to concrete, this description shall include a statement of whether the insert is cast-in or glued-in;

e) origin of test specimens;

f) maximum applied load;

g) result of visual inspection after test.