
Železniške naprave - Zgornji ustroj proge - Zahteve za izdelavo pritrdilnih sistemov - 7. del: Pritrdilni sistemi za kretnice in križišča, vodilne tirnice, izolirane spoje tirnic in naprave za razširitev tirnic

Railway Applications - Track - Performance requirements for fastening systems - Part 7: Fastening systems for switches and crossings, check rails, insulated rail joints and rail expansion devices

Bahnanwendungen - Oberbau - Leistungsanforderungen für Befestigungssysteme - Teil 7: Spezielle Befestigungssysteme für Weichen und Kreuzungen und Radlenker

Applications ferroviaires - Voie - Exigences de performance pour les systèmes de fixation - Partie 7 : Systèmes de fixation pour appareils de voie, contre-rails, dispositifs de dilatation des rails et joints isolés

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93.100 Gradnja železnic Construction of railways

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**Railway Applications - Track - Performance requirements
for fastening systems - Part 7: Fastening systems for
switches and crossings, check rails, insulated rail joints
and rail expansion devices**

Bahnanwendungen - Oberbau -
Leistungsanforderungen für Befestigungssysteme - Teil
7: Spezielle Befestigungssysteme für Weichen und
Kreuzungen und Radlenker

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

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If this draft becomes a European Standard, 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.

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COMITÉ EUROPÉEN DE NORMALISATION
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prEN 13481-7:2021 (E)**European foreword**

This document (prEN 13481-7:2021) has been prepared by Technical Committee CEN/TC 256 “Railway Applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13481-7:2012.

The main changes in this revision are as follows:

- a) Addition of requirements for fastenings for insulated joints and rail expansion devices.
- b) Clarification that the full range of tests does not have to be carried out on every configuration of fastening within S&C.
- c) The inclusion of details of in service testing, replacing the reference to EN 13146-8, which is to be withdrawn.

This European Standard is one of the series EN 13481 “*Railway applications – Track – Performance requirements for fastening systems*” which consists of the following parts:

- *Part 1: Definitions*
- *Part 2: Fastening systems for concrete sleepers in ballast*
- *Part 3: Fastening systems for wood and polymeric composite sleepers*
- *Part 4: Fastening systems for steel sleepers*
- *Part 5: Fastening systems for ballastless tracks*
- *Part 7: Fastening systems for switches and crossings, check rails, rail expansion devices and insulated rail joints*

NOTE Part 6 does not exist in this series.

These are supported by the test methods in the series EN 13146 “*Railway applications – Track – Test methods for fastening systems*”.

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 EU Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

Introduction

A series of tests is used to assess the suitability of fastening systems for use in railway track i.e. for type approval of complete fastening systems. This document only sets requirements considered relevant to ensure the safe, long term operation of the track system. The test methods are described in other associated standards.

The various Categories of rail fastenings used in this document are defined in EN 13481-1:2012.

Annex A of this document lists the different locations in S&C and plain line which are addressed, together with cross-references to the relevant clauses and annexes for each case.

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prEN 13481-7:2021 (E)

1 Scope

This document is applicable to fastening systems, in categories A –E as specified in EN 13481 1:2012, 3.1 for use in switches and crossings. It also provides guidance on evaluating fastening systems for check rails, expansion devices and insulated rail joints whether in switches and crossings or in plain line. The document applies to five categories of fastenings used in tracks with respective maximum axle loads and minimum curve radii as shown in Table 1.

Table 1 — Fastening category criteria

Category	Maximum design axle load kN	Minimum curve radius m
A	130	40
B	180	80
C	260	150
D	260	400
E	350	150

NOTE The maximum axle load for Categories A and B does not apply to maintenance vehicles.

The requirements apply to fastening systems for rail sections included in the EN 13674 series of standards (excluding 49E4).

This document is not applicable to fastening systems for other rail sections or rigid fastening systems used on running rails.

This document is for type approval of complete fastening systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 13146-1:2019, *Railway applications - Track - Test methods for fastening systems - Part 1: Determination of longitudinal rail restraint*

EN 13146-4:2020, *Railway applications - Track - Test methods for fastening systems - Part 4: Effect of repeated loading*

EN 13146-5:2012,¹ *Railway applications - Track - Test methods for fastening systems - Part 5: Determination of electrical resistance*

EN 13146-6:2012, *Railway applications - Track - Test methods for fastening systems - Part 6: Effect of severe environmental conditions*

EN 13146-7:2019, *Railway applications - Track - Test methods for fastening systems - Part 7: Determination of clamping force and uplift stiffness*

¹ Document impacted by AC:2017.

EN 13146-9:2020, *Railway applications - Track - Test methods for fastening systems - Part 9: Determination of stiffness*

EN 13146-10:2017, *Railway applications - Track - Test methods for fastening systems - Part 10: Proof load test for pull-out resistance*

prEN 13232-1:2020, *Railway applications – Track - Switches and crossings – Part 1: Definitions*

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

prEN 13481-2:2020, *Railway applications – Track – Performance requirements for fastening systems – Part 2: Fastening systems for concrete sleepers*

prEN 13481-3:2020, *Railway applications – Track – Performance requirements for fastening systems – Part 3: Fastening systems for wood sleepers*

prEN 13481-4:2020, *Railway applications – Track – Performance requirements for fastening systems – Part 4: Fastening systems for steel sleepers*

prEN 13481-5:2020, *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 13674-1:2011+A1:2017, *Railway applications - Track - Rail - Part 1: Vignole railway rails 46 kg/m and above*

EN 13674-4:2019, *Railway applications - Track - Rail - Part 4: Vignole railway rails from 27 kg/m to, but excluding 46 kg/m*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions and the terms and definitions given in EN 13481-1:2012 and prEN 13232-1:2020 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

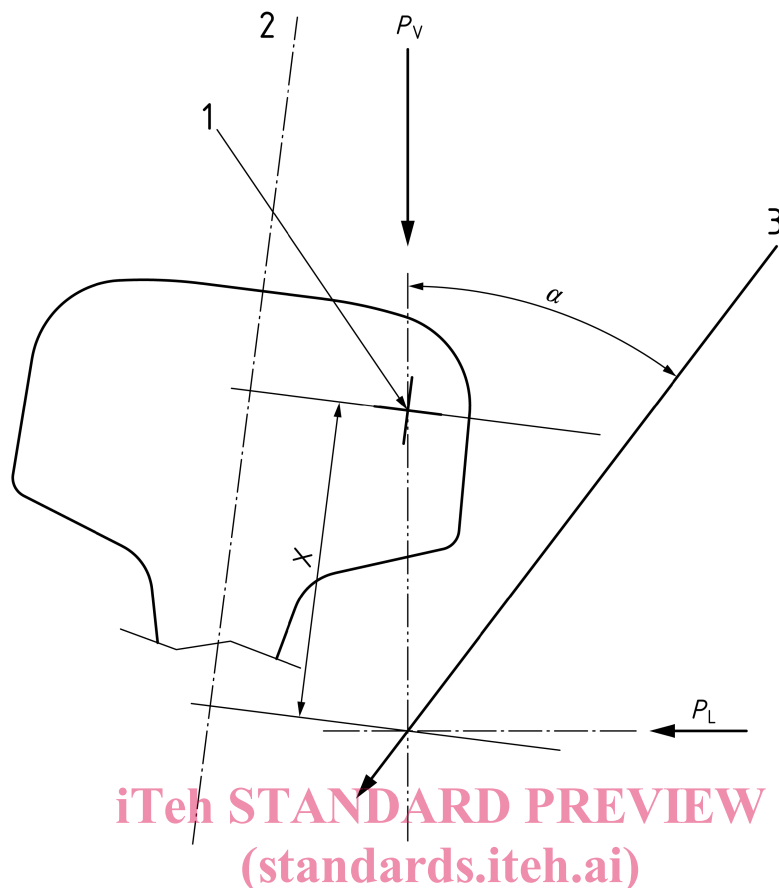
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

datum for applied test loads

flat bottom surface of a conventional concrete sleeper used as a datum plane to define the orientation of the applied test loads

Note 1 to entry: For fastenings on sleepers, bearers or elements of ballastless track which do not have a flat bottom surface, the orientation of the test loads is defined relative to “running surface of the rails” which is defined in EN 13481-1:2019. See Figure 1.

**Key**

- | | | |
|---|---------------------------------|---|
| 1 | centre of gauge corner radius | oSIST prEN 13481-7:2021 |
| 2 | centre line of the rail profile | standards.iteh.ai/catalog/standards/sist/9581760f-d074-4eb7-832f-42c9f572eceb/osist-pren-13481-7-2021 |
| 3 | line of load application | |

Figure 1 — Load application position**3.2****purchaser**

operator, owner or user of the rail fastening system

3.3**supplier**

body responsible for the use of this European Standard

Note 1 to entry: Sometimes the manufacturer is also the supplier.

3.4**approved for use in plain line**

complies with the requirements of prEN 13481-2:2020 for use on concrete bearers, prEN 13481-3:2020 for use on wood or polymeric composite bearers, prEN 13481-4:2020 for use on steel bearers or prEN 13481-5:2020 for use on ballastless track

4 Symbols

For the purposes of this document, the following symbols apply.

- F_{\max} axial load at which gross slip occurs in the longitudinal rail restraint test (EN 13146-1:2019 or in kN);
- P_L component of load parallel to the datum, in kN;
- P_V component of load normal to the datum, in kN;
- X distance between the line of application of P_L and the centre of the gauge corner radius of the rail head as shown in Figure 1, in mm;
- α angle between the load line and a line normal to the datum as shown in Figure 1, in °.

5 Requirements to be determined by laboratory testing

5.1 Special fastenings for slide baseplates

5.1.1 General

The requirements set out in this subclause are applicable to fastenings for slide baseplates in S&C.

NOTE: Where hollow bearers are used, specific requirements for the fastening system are set out in EN 16431:2014.

5.1.2 Specimens for laboratory testing

For fastenings intended for use on ballasted track, the test specimen shall consist of the slide baseplate mounted on part of a bearer and assembled with a short length of the stock rail.

Fastenings intended for use on ballastless track shall be tested on a supporting element as set out in EN 13481-5:2020 and assembled with a short length of the stock rail.

Where a number of similar slide baseplates need to be considered, representative configuration(s) shall be selected as Reference Configuration(s) as set out in Annex B, and shall be tested in a laboratory to demonstrate compliance with the requirements set out in 5.1.3 to 5.1.9 below.

Compliance of other similar configurations of slide chair may be demonstrated as follows:

- a) The differences between the modified configuration of slide chair and the Reference Configuration shall be identified and listed.
- b) Compliance with the requirements of this standard shall be demonstrated by assessing the effects of those differences on each requirement by means of calculation or supplementary testing.

5.1.3 Longitudinal rail restraint

When measured by the procedure in EN 13146-1:2019 before any repeated load test is carried out, the longitudinal rail restraint shall be not less than the following values:

- a) 7 kN when rail pads are used under stock rails.
- b) 5 kN when no pads are used.