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Railway applications - Track - Performance requirements for fastening systems - Part 7: Special fastening systems for switches and crossings and check rails

EESTI STANDARDI EESSÕNA

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English Version

**Railway applications - Track - Performance requirements for
fastening systems - Part 7: Special fastening systems for
switches and crossings and check rails**

Applications ferroviaires - Voie - Exigences de performance
pour les systèmes de fixation - Partie 7: Systèmes de
fixation spéciaux pour appareils de voie et contre-rails

Bahnanwendungen - Oberbau - Leistungsanforderungen für
Schienenbefestigungssysteme - Teil 7: Spezielle
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Foreword

This document (EN 13481-7:2012) 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of an identical text or by endorsement, at the latest by November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.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 13481-7:2003.

The main changes in this revision of EN 13481-7:2003 are as follows:

- a) new categories of fastening systems have been introduced (Clause 1, Table 1);
- b) the ranges of test loads have been extended to cover the new categories of fastening systems (5.4);
- c) advice on attenuation of noise and vibration has been added in a new annex (Annex A).

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*
- *Part 3: Fastening systems for wood sleepers*
- *Part 4: Fastening systems for steel sleepers*
- *Part 5: Fastening systems for slab track with rail on the surface or rail embedded in a channel*
- *Part 7: Special fastening systems for switches and crossings and check rails*

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 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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.

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Introduction

Various tests are necessary to assess the performance for fastening systems of railway tracks. In this European Standard, a requirement for longitudinal rail restraint is included to control rail creep.

The laboratory test for the effect of repeated loading is the means of assessing potential long term performance of the fastening in track.

The test for clamping force is only suitable for laboratory use. The measurement of clamping force in track can be used to monitor long term performance. The method of measurement used should be suitable for the design of the particular fastening system.

1 Scope

This European Standard specifies performance requirements for special fastening systems, in categories A – E as specified in EN 13481-1:2012, 3.1, for switches and crossings and check rails secured within the overall fastening system (not independently fixed to the bearers) on wood, concrete and steel bearers, in ballasted track and on slab track and which have maximum axle loads and minimum curve radii in divergent track in accordance with 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 which incorporate a resilient element and act on the foot and/or web of the rail and which are intended for use with stock rail sections in EN 13674-1 (excluding 49E4) and EN 13674-4+A1.

This standard is not applicable to rigid fastening systems.

This standard is for type approval of a complete fastening assembly only. Requirements for quality control are included in the standards applicable to individual components.

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 13146-1:2012, *Railway applications – Track – Test methods for fastening systems – Part 1: Determination of longitudinal restraint*

EN 13146-2:2012, *Railway applications – Track – Test methods for fastening systems – Part 2: Determination of torsional resistance*

EN 13146-3:2012, *Railway applications – Track – Test methods for fastening systems – Part 3: Determination of attenuation of impact loads*

EN 13146-4:2012, *Railway applications – Track – Test methods for fastening systems – Part 4: Effect of repeated loading*

EN 13146-5:2012, *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 13146-7:2012, *Railway applications – Track – Test methods for fastening systems – Part 7: Determination of clamping force*

EN 13146-8:2012, *Railway applications – Track – Test methods for fastening systems – Part 8: In service testing*

EN 13146-9:2009+A1:2011, *Railway applications – Track – Test methods for fastening systems – Part 9: Determination of stiffness*

EN 13232-1:2003, *Railway applications – Track – Switches and crossings – Part 1: Definitions*

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 13674-1, *Railway applications – Track – Rail – Part 1: Vignole railway rails 46 kg/m and above*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13232-1:2003 and EN 13481-1:2012 apply.

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 13146-1:2012), in kN;
L	lateral component of force transmitted by the wheel to the rail head as shown in Figure 1, in kN;
P_L	component of load parallel to the running surface of the rails, in kN;
P_V	component of load normal to the running surface of the rails, in kN;
V	vertical component of load transmitted by the wheels to the running surface at the rail head as shown in Figure 1, 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 running surface of the rails as shown in Figure 1, in °.

NOTE $\frac{L}{V} = \frac{P_L}{P_V} = \tan \alpha$