

Raudteealased rakendused. Rööbastee. Nõuded rööpa kinnitussüsteemide tööomadustele. Osa 5: Paneeli pinnale või süvendisse kinnitatud rööbastega jäiga rööbastee rööpa kinnitussüsteemid

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

**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**

Applications ferroviaires - Voie - Exigences de performance
pour les systèmes de fixation - Partie 5: Systèmes de
fixations des voies sans ballast ou voies avec rails enrobés

Bahnanwendungen - Oberbau - Leistungsanforderungen für
Schienenbefestigungssysteme - Teil 5:
Befestigungssysteme für feste Fahrbahn mit aufgesetzten
oder in Kanälen eingebetteten Schienen

This European Standard was approved by CEN on 27 April 2012.

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Foreword

This document (EN 13481-5:2012) 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of an identical text or by endorsement, at the latest by November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.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 13481-5:2002.

The main changes in this revision of EN 13481-5:2002 are as follows:

- a) the scope has been extended to include fastening systems for embedded rail (Clause 1);
- b) new categories of fastening systems have been introduced (Clause 1, Table 1);
- c) the ranges of test loads have been extended to cover the new categories of fastening systems (5.2, Table 2 and 5.3, Table 3);
- d) 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 European Standards 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.

Introduction

Various tests are necessary to assess the performance of fastening systems of railway tracks. In this European Standard, a requirement for longitudinal rail restraint is included to control rail creep and pull apart in the event of a broken rail. The relationship between longitudinal rail restraint and the overall design of the track slab requires consideration.

No satisfactory test is available to determine the attenuation of impact loads on slab track. The relative performance may be assessed by the procedure in EN 13146-3:2012 with the fastening system on a concrete sleeper.

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

For systems in which the rail is continuously supported, test procedures are modified to take account of the change from discrete support.

1 Scope

This European Standard is applicable to fastening systems, in categories A – D as specified in EN 13481-1:2012, 3.1, for attaching rails to the uppermost surface of concrete or asphalt slabs and for embedded rails in non-ballasted tracks, with maximum axle loads and minimum curve radii in accordance with Table 1.

Table 1 — Fastening category criteria

Category	Maximum design axle load	Minimum curve radius
	kN	m
A	130	40
B	180	80
C	260	150
D	260	400
NOTE The maximum axle load for categories A and B does not apply to maintenance vehicles.		

The requirements apply to:

- fastening systems which act on the foot and/or web of the rail including direct and indirect systems;
- fastening systems which incorporate concrete elements and which each have not more than one supporting element per rail, including booted concrete blocks and sleepers complete with boots;
- adhesive and mechanical fastening systems for embedded rail but excluding rail cast into road pavements.

In the case of (b), the concrete element is considered to be part of the fastening system. If the system includes concrete elements which each have more than one supporting location per rail, those concrete elements are considered to be part of the slab and not part of the fastening system.

This standard is only applicable to fastening systems for rail sections in EN 13674-1 (except 49E4) and EN 13674-4+A1; it is not applicable to special fastening systems for use at bolted joints or glued joints.

This standard is for type approval of a complete fastening assembly only.

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 13146-4:2012, *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 13146-8:2012, *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 13230-1:2009, *Railway applications – Track – Concrete sleepers and bearers – Part 1: General requirements*

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 13674-1:2011, *Railway applications – Track – Rail – Part 1: Vignole railway rails 46 kg/m and above*

EN 13674-4+A1, *Railway applications – Track – Rail – Part 4: Vignole railway rails from 27 kg/m to, but excluding 46 kg/m*

3 Terms and definitions

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

4 Symbols

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

D_r	maximum longitudinal displacement of rail prior to slip, in mm (EN 13146-1:2012);
F_{HFAmax}	static preload applied in measurement of high frequency stiffness of assembly, in kN;
F_{LFA1}	minimum force applied in measurement of dynamic low frequency stiffness of assembly, in kN;
F_{LFAmax}	reference force for measurement of dynamic low frequency stiffness of assembly, in kN;
F_{LFP1}	notional fastening clip force assumed for measurement of dynamic low frequency stiffness of pad, in kN;
F_{LFPmax}	reference force for measurement of dynamic low frequency stiffness of pad, in kN;
F_{max}	axial load at which gross slip occurs in the longitudinal rail restraint test (EN 13146-1:2012), in kN;
F_{SA1}	minimum force applied in measurement of static stiffness of assembly, in kN;
F_{SAmax}	force applied to assembly in measurement of static stiffness of assembly, in kN;
F_{SP1}	notional fastening clip force assumed for measurement of static stiffness of pad, in kN;
F_{SPmax}	force applied to pad in measurement of static stiffness of pad, in kN;
k_L	longitudinal stiffness in accordance with EN 13146-1:2012, in MN/m;