BS EN 13146-1:2019

BSI Standards Publication

Railway applications - Track - Test methods for fastening systems

Part 1: Determination of longitudinal rail restraint

bsi.

National foreword

This British Standard is the UK implementation of EN 13146-1:2019. It supersedes BS EN 13146-1:2012+A1:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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European foreword

This document (EN 13146-1:2019) 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identical text or by endorsement, at the latest by month year of July 2019, and conflicting national standards shall be withdrawn at the latest by month year of July 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13146-1:2012+A1:2014.

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

In this European Standard, the test procedure has been adapted to be applicable to embedded rail as well as surface mounted rail. For embedded rail with an adhesive fastening system the test result is expressed as longitudinal stiffness.

Compared with EN 13146-1:2012+A1:2014, the following changes have been made:

a) update of the European foreword;

b) extension of the scope to embedded rails;

c) adaptation of normative references;

d) adaptation of the terms;

e) considers the requirements of EN 13146-9 for static and dynamic stiffnesses;

f) Clause 7 revised and calculation of the interaction between superstructures newly added;

g) editorially revised.

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 and uplift stiffness;*

— *Part 8: In service testing;*

— *Part 9: Determination of stiffness;*

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

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 organisations 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.

Introduction

For fastening systems that hold the rail mechanically (whether at discrete intervals or continuously) the test procedure measures the longitudinal rail restraint. For an embedded rail with an adhesive fastening system the test procedure measures the longitudinal stiffness.

1 Scope

This document specifies the laboratory test procedure to determine:

a) the maximum longitudinal force that can be applied to a rail, secured to a sleeper, bearer or element of slab track by a rail fastening assembly, without non-elastic displacement of the rail occurring, or the longitudinal stiffness at a specified longitudinal displacement of a specimen of embedded rail with an adhesive fastening system, and, for any type of fastening,

b) the shear displacement and slip data required for track-bridge interaction calculations.

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

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

EN ISO 7500-1:2018, *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 7500-1:2018)*

EN ISO 9513:2012, *Metallic materials — Calibration of extensometer systems used in uniaxial testing (ISO 9513:2012)*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.2 Symbols

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

D_1 maximum longitudinal displacement of rail during each cycle of loading, in mm;

D_2 residual longitudinal displacement of rail after removal of load, in mm;

D_3 elastic longitudinal displacement of rail prior to slip, in mm;

D_r maximum longitudinal displacement of embedded rail with adhesive fastening system, in mm;

F maximum axial load on the rail without non-elastic displacement occurring, in kN;

F_{max} axial load at which gross slip occurs, in kN;

k_L longitudinal stiffness of embedded rail with adhesive fastening system, in kN/mm per m;