SLOVENSKI STANDARD
SIST EN 13146-5:2004

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Železniške naprave - Zgornji ustroj - Preskušanje pritrdilnih sistemov - 5. del: Ugotavljanje električne upornosti

Railway applications - Track - Test methods for fastening systems - Part 5: Determination of electrical resistance

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 5: Bestimmung des elektrischen Widerstandes

Applications ferroviaires - Voie - Méthodes d'essai pour les systemes de fixation - Partie 5: Détermination de la résistance électrique

Ta slovenski standard je istoveten z: **EN 13146-5:2002**

ICS:

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English version

Railway applications - Track - Test methods for fastening systems - Part 5: Determination of electrical resistance

Applications ferroviaires - Voie - Méthodes d'essai pour les systèmes de fixation - Partie 5: Détermination de la résistance électrique

Bahnanwendungen - Oberbau - Prüfverfahren für Schienenbefestigungssysteme - Teil 5: Bestimmung des elektrischen Widerstandes

This European Standard was approved by CEN on 18 October 2002.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 13146-5:2002) 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 May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

This document has been prepared under mandates (M/024[1]), M/275[2])) given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s). No existing European Standard is superseded.

In this European Standard the annex A is informative.

This European Standard is one of the series EN 13146 as listed below.

— *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*

These support the requirements in the series EN 13481 Railway applications — Track — Performance requirements for fastening systems — Parts 1 to 7.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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[1]) Railway equipment.

[2]) Standardization in the field of Railway Equipment on the Interoperability of the Trans-European High-Speed Rail System.

1 Scope

This Part of this European Standard specifies a laboratory test procedure for determining the electrical resistance, in wet conditions, between the running rails provided by a fastening system fitted to a steel or concrete sleeper, bearer or element of slab track.

This test procedure applies to a complete fastening assembly.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 27888, *Water quality - Determination of electrical conductivity (ISO 7888:1985).*

EN 13481-1:2002, *Railway applications — Track — Performance requirements for fastening systems — Part 1: Definitions.*

3 Terms and definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13481-1:2002 apply.

3.2 Symbols and abbreviations

For the purposes of this European Standard, the following symbols apply.

K_γ correction factor for the conductivity of the water used;

R_γ measured resistance, in Ω;

R_{33} resistance corrected to γ = 33 mS/m, in Ω;

γ conductivity of water used, in mS/m.

4 Principle

The electrical resistance between two short lengths of rail fastened to the support is measured whilst the whole support and fastenings are sprayed with water at a controlled rate. Correction is made for the conductivity of the water by applying the factor K_γ.

5 Apparatus

5.1 Rail

Two short lengths (approximately 0,5 m) of rail, of the section for which the fastening assembly under test is designed. The rail shall be unlaminated and have no loose rust on the surface nor be polished on the foot.

5.2 Water

A potable water supply having known conductivity in the range (20 to 80) mS/m measured in accordance with EN 27888 at the temperature at the time of spraying and corrected to a temperature of 25 °C.

NOTE Correction factors are given in EN 27888.

5.3 Spray equipment

A frame which can be moved parallel to the rails, incorporating four spray nozzles as shown in Figure 1. The nozzles shall have a diameter 3,6 mm and a spray cone of 100° to 125°. The equipment shall include a means of controlling and measuring the flow of water to each nozzle.

5.4 Electricity supply

Alternating current supply of (30 ± 3) V RMS and (50 ± 15) Hz.

5.5 Instruments

Instruments to measure the applied voltage and resultant current flow between the rails with an accuracy of 1 % which permit the calculation of resistance over the range 1 x 10^2 Ω to 1 x 10^6 Ω. The equipment shall have a capability to print out a record of calculated resistance against time.

The calibration of the instruments shall be verified with equipment having certified traceability to European or International Standards using the International System of units (SI).

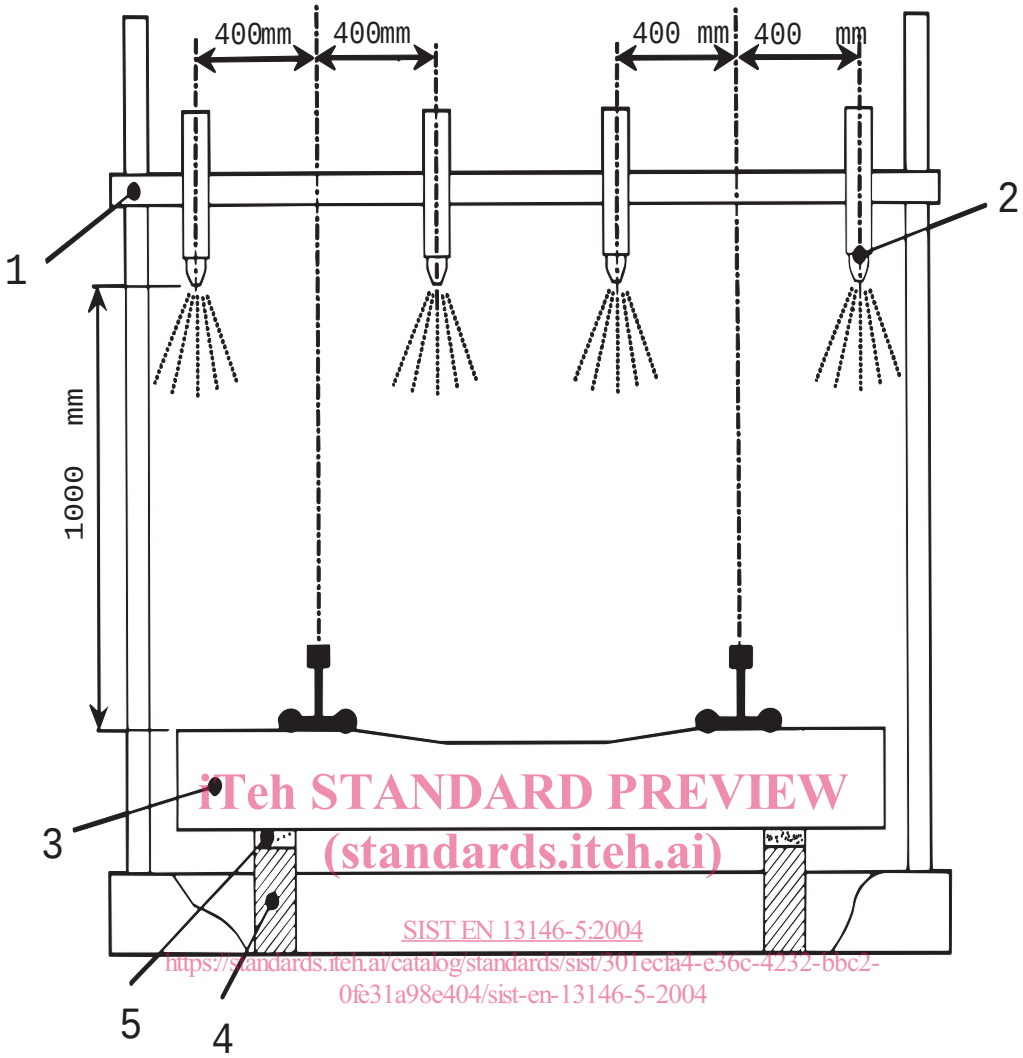
6 Test specimens

Three steel or concrete sleepers or bearers or elements of slab track with cast-in fastening components or holes and rail seats as made without modification for this test. Each specimen is tested individually. The test specimens are described as sleepers in the test procedure.

7 Procedure

The test shall be carried out under cover and protected from rain and draughts in a room which is ventilated and has an air temperature (15 to 30) °C. Fit the rails to one sleeper using all the fastening components as assembled in track. Support the sleeper, which shall be surface dry, on two electrically insulating blocks, not less than 50 mm thick, as shown in Figure 1.

NOTE Suitable supports are wood blocks with plastics pads attached to provide insulation.



Key

1 spray frame
2 spray nozzles as described in 5.3
3 test sleepers as described in clause 6
4 wood blocks
5 plastics pads

Figure 1 — Test arrangement

If the sleeper has not been used for this test before, carry out the spraying procedure and leave for not less than 24 h or until surface dry, whichever is longer, before performing the test.

Set up the measuring instruments as shown in Figure 2 and connect to the electrical supply. Move the spray equipment over the sleeper and spray with water at (10 to 20) °C at a rate of (7 ± 1) l/min from each nozzle for 2 min. Record the voltage and current during spraying and for not less than 10 min after spraying has ceased.

Repeat the test twice more on other similar test specimens. If a specimen has been previously tested allow not less than 24 h or the time taken for the specimen to become surface dry, whichever is the longer, between tests.

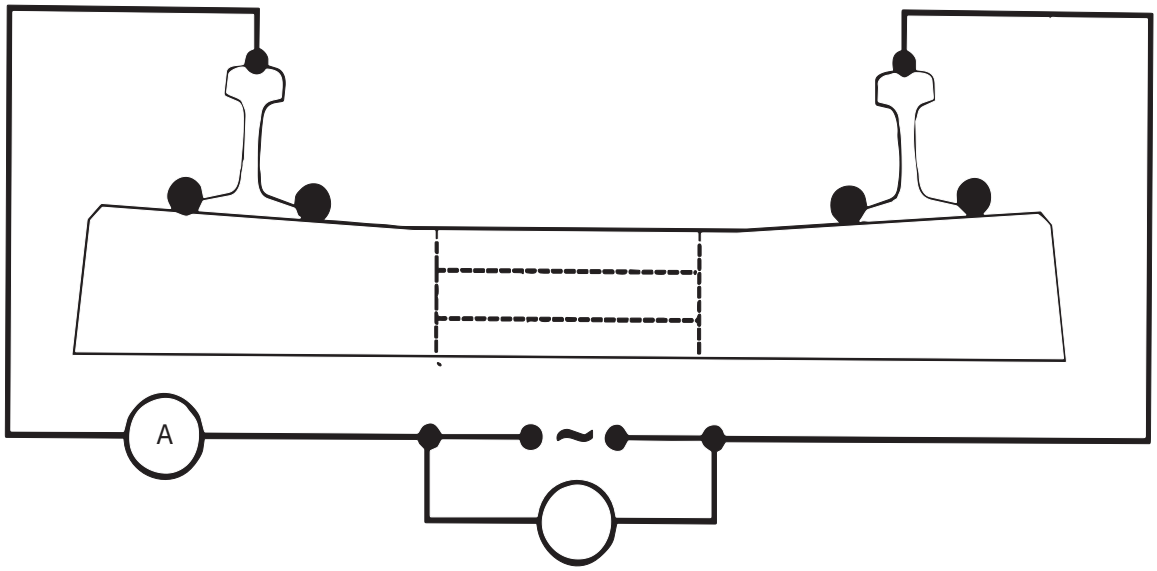


Figure 2 — Measurement circuit

8 Calculations

For each test find the minimum resistance R_γ from the resistance-time plot. Calculate the corrected resistance from the following equation.

$$R_{33} = K_\gamma R_\gamma \quad \text{in } \Omega$$

where

$K_\gamma = 0{,}03\ \gamma$

The result of the test is the arithmetic mean of the three values of R_{33} obtained.

9 Test report

The test report shall include at least the following information:

a) number, date of issue and title of this standard;

b) name and address of laboratory performing the test;

c) date test performed;

d) name, designation and description of fastening assembly, including individual components, tested;

e) origin of test specimens;

f) rail section used in test;

g) details of the sleeper, bearer or element of slab track used;

h) conductivity of water used;

i) Resistance-time plot for each test and minimum value of R_{33}.