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Railway applications - Current collection systems - Pantographs, testing methods for contact strips

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NATIONAL FOREWORD

See Eesti standard EVS-EN 50405:2015 sisaldab Euroopa standardi EN 50405:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 50405:2015 consists of the English text of the European standard EN 50405:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.12.2015.	Date of Availability of the European standard is 18.12.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Railway applications - Current collection systems - Pantographs, testing methods for contact strips

Applications ferroviaires - Systèmes de captage de courant - Méthodes d'essais des bandes de frottement des pantographes

Bahnanwendungen - Stromabnahmesysteme - Stromabnehmer für Oberleitungsfahrzeuge, Prüfverfahren für Schleifstücke

European Committee for Electrotechnical Standardization
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European foreword

This document (EN 50405:2015) has been prepared by CLC/SC 9XB "Electromechanical material on board of rolling stock".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-11-16
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-11-16

This document supersedes EN 50405:2006.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Introduction

This European Standard defines testing methods for pantograph contact strips, but excludes wear tests, and tests using a particular pantograph.

In this issue of the standard, additional clauses have been included to address the European Rail Agency (ERA) request for standard (IU-RFS-024 of 3rd July 2009) which requested that this standard specifies the assessment methods for contact strips of different materials as specified in the High Speed and Conventional Rail Locomotives and Passenger rolling-stock technical specifications for interoperability (LOC and PAS TSIs). A method for determining the metal content for metal impregnated (metalized) contact strips (7.8) has been added in this issue of the standard. Tests for the coefficient of friction (7.9) and impact resistance of the carbon material (7.10) have also been included in this revision.

The Locomotives and Passenger rolling-stock technical specification for interoperability (COMMISSION REGULATION (EU) No 1302/2014 of 18 November 2014) (LOC and PAS TSI) chapter 4.2.8.2.9.4.2 states:

4.2.8.2.9.4.2 Contact strip material

(1) Material used for the contact strips shall be mechanically and electrically compatible with the contact wire material (as specified in Clause 4.2.14 of the ENE TSI, in order to ensure proper current collection and to avoid excessive abrasion of the surface of the contact wires, thereby minimising wear of both contact wires and contact strips.

(2) Plain carbon or impregnated carbon with additive material shall be permitted.

Where a metallic additive material is used, the metallic content of the carbon contact strips shall be copper or copper alloy and shall not exceed a content of 35 % by weight where used on AC lines and of 40 % where used on DC lines.

Pantographs assessed against this TSI shall be fitted with contact strips of a material mentioned above.

(3) Additionally, contact strips of other material or higher percentage of metallic contents or impregnated carbon with cladded copper are allowed (if permitted in the infrastructure register) provided that:

— they are referenced in recognised standards, with mention of restrictions if any, or

— they have been subject to a test of suitability for use (see 6.1.3.8).

Evidence from the UIC project “COSTRIM” testing of a sample of carbon contact strips has shown the difficulty of defining a cross-industry wear test. This could be the subject of a new requirement following further analysis of the COSTRIM results for a future revision of this standard. (These values were determined as a result of the tests undertaken under the COSTRIM project, and are the limit of the tests carried out, rather than an absolute limit.)

Although not currently applicable to contact strips for railway applications, it should be noted that certain materials listed in the EU Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment 2011/65/EU are prohibited from use in certain applications.

1 Scope

This European Standard specifies testing methods to establish the basic characteristics of newly manufactured pantograph contact strips. Not all tests may be relevant to some designs of contact strips. This standard does not define tests for pure metallic contact strips.

This European Standard excludes wear tests, and tests using a particular pantograph. Additional supplementary tests, out of the scope of this standard, may be necessary to determine suitability for a particular application and are by prior agreement between customer and manufacturer.

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 ISO 148-1:2010, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2009)*

EN ISO 179-1:2010, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test (ISO 179-1:2010)*

EN ISO 180:2000, *Plastics — Determination of Izod impact strength (ISO 180:2000)*

IEC 60413:1972, *Test procedures for determining physical properties of brush materials for electrical machines*

IEC 60773:1983, *Test methods and apparatus for measurement of the operational characteristics of brushes*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General

3.1.1
air flow continuity
uninterrupted flow of air

3.1.2
air flow rate
flow rate, in standard litres per minute, based upon mass flow to be calculated at the standard temperature and pressure (STP)

Note 1 to entry: Referenced at a temperature of 15 °C (288,15 K, 59 °F) and an absolute pressure of 101,325 kPa (1,013 25 bar, 1 standard atmosphere (atm)).

Note 2 to entry: Based upon the Standard Temperature and Pressure defined by EN ISO 13443:2005.

3.1.3
auto-drop detection sensor
function incorporated in the contact strip which initiates the pantograph automatic dropping device