

© Copyright SEK. Reproduction in any form without permission is prohibited.

Järnvägsanläggningar – Strömvtagare – Egenskaper och provning – Del 1: Strömvtagare för järnvägsfordon

Railway applications –

Rolling stock –

Pantographs: Characteristics and tests –

Part 1: Pantographs for main line vehicles

Som svensk standard gäller europastandarden EN 50206-1:2010. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50206-1:2010.

Nationellt förord

Standarden ersätter tidigare fastställd svensk standard SS-EN 50206-1, utgåva 1, 1998 och SS-EN 50206-1 C1, utgåva 1, 2010, som fortsätter att gälla tillsvidare.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English version

**Railway applications -
Rolling stock -
Pantographs: Characteristics and tests -
Part 1: Pantographs for main line vehicles**

Applications ferroviaires -
Matériel roulant -
Pantographes: Caractéristiques et essais
-
Partie 1: Pantographes pour véhicules
grandes lignes

Bahnanwendungen -
Schienenfahrzeuge -
Merkmale und Prüfungen
von Stromabnehmern -
Teil 1: Stromabnehmer
für Vollbahnfahrzeuge

This European Standard was approved by CENELEC on 2010-05-01. CENELEC 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 Central Secretariat or to any CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

This European Standard was prepared by SC 9XB, Electromechanical material on board rolling stock, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways. It was submitted to the CENELEC formal vote and was approved by CENELEC as EN 50206-1 on 2010-05-01.

This document supersedes EN 50206-1:1998.

The main changes brought by this revision are:

- simplification and standardisation of the tolerances for static contact force (Annexes A and B);
- definition of a new investigation test "Measurement of mean static contact force at ambient temperature" (6.3.4);
- definition of a new combined test "Check of operating system at maximum speed" (6.14);
- adjustment of terms to TSI (static contact force instead of static force);
- deletion of Clause 10;
- update of normative references.

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

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement | (dop) | 2011-05-01 |
| – latest date by which the national standards conflicting
with the EN have to be withdrawn | (dow) | - * |

* D115/202: No dow fixed as long as EN 50206-1:1998 is referenced as such in Technical Specifications for Interoperability (TSIs).

Contents

Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
3.1 General	6
3.2 Design	7
3.3 General characteristics	8
4 Technical requirements	9
4.1 Gauge	9
4.2 Extension of the pantograph	9
4.3 Electrical values	10
4.4 Force requirements	10
4.5 Transverse rigidity	10
4.6 Collector head	10
4.7 Operating system	10
4.8 Automatic Dropping Device (A.D.D.)	11
4.9 Pantograph mass and force on the roof	11
4.10 Protection against corrosion	11
5 Marking	11
6 Tests	11
6.1 Categories of tests	11
6.2 General tests	12
6.3 Operating tests	14
6.4 Endurance tests	15
6.5 Resistance to shocks (supplementary type test)	16
6.6 Transverse rigidity test (type test)	17
6.7 Air tightness tests	17
6.8 Measurement of degrees of freedom of collector head (routine test)	18
6.9 Measurement of housing force (type test)	18
6.10 Total mean uplift force (combined test)	18
6.11 Total contact force (combined test)	19
6.12 Current collection tests (combined test)	19
6.13 Heating tests	19
6.14 Check of operating system at maximum speed (combined test)	20
7 Inspection plan	20
8 Reliability	20
8.1 General	20
8.2 Specification	21
8.3 In-service reliability demonstration	21
9 Maintenance	21
9.1 Structure	21
9.2 Collector head structure	21
9.3 Maintainability	21
Annex A (normative) Static contact force tolerances	22

Annex B (normative) List of tests	23
Annex C (informative) Items to be specified in customer specification	24
Bibliography	25

Figures

Figure 1 – Pantograph terminology	8
Figure 2 – Test principle	17
Figure A.1 – Static contact force tolerances (grey area)	22

Tables

Table 1 – Design definitions	7
Table B.1 – Catalogue of tests	23

Introduction

The electrical power supply of a tractive unit is achieved by the collection of current from one or more contact wires by means of one or more pantograph(s), installed on the traction unit or on the trainset's vehicle.

The contact strips of the pantograph which slide along the contact wire facilitate the transmission of power.

The pantograph and the overhead contact line system form two oscillating sub-systems which can be displaced. There exists a unilateral sliding linkage between them, which shall ensure continuous contact. Their design shall allow for minimum wear of both sub-systems when used.

1 Scope

This European Standard specifies the general assembly characteristics which are to be applied to pantographs, to enable current collection from the overhead contact line system. It also specifies the tests the pantographs have to perform, excluding insulators.

This European Standard is not applicable to pantograph dielectric tests, which are to be performed on the pantograph installed on the vehicle roof. If no other requirement is agreed between customer and supplier, insulation coordination according to EN 50124-1 may be used.

This European Standard is not applicable to pantographs used on isolated metros and light rail systems. These pantographs are considered in EN 50206-2.

2 Normative references

The following referenced documents are indispensable for the application 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 50125-1, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

EN 50126 series, *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*

EN 50163, *Railway applications – Supply voltages of traction systems*

EN 50317, *Railway applications – Current collection systems – Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*

EN 50367, *Railway applications – Current collection systems – Technical criteria for the interaction between pantograph and overhead line (to achieve free access)*

EN 60077 (series), *Railway applications – Electric equipment for rolling stock* (IEC 60077 series)

EN 61373, *Railway applications – Rolling stock equipment – Shock and vibration tests* (IEC 61373)

