SLOVENSKI STANDARD
oSIST prEN 50367:2018

01-april-2018

Železniške naprave - Sistemi za odjem toka - Tehnični kriteriji za interaktivnost med odjemnikom toka in kontaktnim vodnikom (za doseganje prostega dostopa)

Railway applications - Current collection systems - Technical criteria for the interaction between pantograph and overhead line (to achieve free access)

Bahnanwendungen - Zusammenwirken der Systeme - Technische Kriterien für das Zusammenwirken zwischen Stromabnehmer und Oberleitung für einen freien Zugang

Applications ferroviaires - Systèmes de captage de courant - Critères techniques d'interaction entre le pantographe et la ligne aérienne de contact (réalisation du libre accès)

Ta slovenski standard je istoveten z: **prEN 50367:2017**

ICS:

29.280	Električna vlečna oprema	Electric traction equipment

oSIST prEN 50367:2018 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 50367

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ICS 29.280

Will supersede EN 50367:2012

English Version

Railway applications - Current collection systems - Technical criteria for the interaction between pantograph and overhead line (to achieve free access)

Applications ferroviaires - Systèmes de captage de courant - Critères techniques d'interaction entre le pantographe et la ligne aérienne de contact (réalisation du libre accès)

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2018-04-20.

It has been drawn up by CLC/SC 9XC.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

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European foreword

This document (prEN 50367:2018) has been prepared by CLC/TC 9XC “Electric supply and earthing systems for public transport equipment and ancillary apparatus (Fixed installations)”.

This document is currently submitted to the Enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

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.

Compared with the previous version, the most significant changes in this version are:

- testing method for DC contact strips: 6.3, A.3;
- lateral deviation: changes to 5.2.5 based on RfS 51 from the European Union Agency for Railways;
- revision of 5.3.2, including updating of figures;
- addition of an introduction for Annex B;
- addition and revision of Table 8;
- addition and revision of the assessment rules in Clause 9.

1 Scope

This European Standard specifies requirements for the interaction between pantographs and overhead contact lines, to achieve to achieve free access.

NOTE These requirements are defined for a limited number of pantograph types, referred to as an 'interoperable pantograph' according to 5.3, together with the geometry and characteristics of compatible overhead contact lines.

This European Standard describes parameters and values for planned and future lines.

Annex B gives some parameters for existing lines (informative).

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 15273-1:2013+A1:2016, *Railway applications - Gauges - Part 1: General - Common rules for infrastructure and rolling stock*

EN 15273-2:2013+A1:2016, *Railway applications - Gauges - Part 2: Rolling stock gauge*

EN 15273-3:2013+A1:2016, *Railway applications - Gauges - Part 3: Structure gauges*

EN 50119:2009[1], *Railway applications - Fixed installations - Electric traction overhead contact lines*

EN 50149:2012, *Railway applications - Fixed installations - Electric traction - Copper and copper alloy grooved contact wires*

EN 50206-1:2010, *Railway applications - Rolling stock - Pantographs: Characteristics and tests - Part 1: Pantographs for main line vehicles*

EN 50317:2012, *Railway applications - Current collection systems - Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line*

EN 50318:2002, *Railway applications - Current collection systems - Validation of simulation of the dynamic interaction between pantograph and overhead contact line*

EN 50388:2012, *Railway applications – Power supply and rolling stock – Technical criteria for the coordination between power supply (substation) and rolling stock to achieve interoperability*

EN 50405:2015[2], *Railway applications – Current collection systems – Pantographs, testing methods for carbon contact strips*

IEC 60050-811:1991, *International Electrotechnical Vocabulary – Chapter 811: Electrical traction*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-811:1991 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

[1] As impacted by EN 50119:2009/A1:2013.

[2] As impacted by EN 50405:2015/A1:2016.

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
arcing
flow of current through an air gap between a contact strip and a contact wire usually indicated by the emission of intense light

[SOURCE: EN 50317:2012]

3.2
automatic dropping device
device that lowers the pantograph in the event of pantograph head failure or damage of the pantograph head

[SOURCE: EN 50206-1:2010]

3.3
contact force
vertical force applied by the pantograph to the overhead contact line

Note 1 to entry: The contact force is the sum of forces of all contact points.

[SOURCE: EN 50317:2012]

3.4
contact plane
plane parallel to the base frame of the pantograph at the contact point

3.5
contact point
point of the mechanical contact between a contact strip and a contact wire

[SOURCE: EN 50317:2012]

3.6
contact wire height
distance from the top of the rail to the lower face of the contact wire, measured perpendicular to the track

[SOURCE: EN 50119:2013]

3.7
continuous pantograph head profile
pantograph head with collector strips and horns suspended in one piece

3.8
encroachment of the pantograph head above the contact plane
perpendicular distance from the contact plane to the highest point of the pantograph head

Note 1 to entry: Additional information is given in EN 15273-1:2013+A1:2016, Figure 45.

3.9
maximum contact wire height
maximum possible contact wire height which the pantograph is required to reach, in all cases

[SOURCE: EN 50119:2013]

3.10
maximum design contact wire height
maximum theoretical contact wire height not including tolerances and uplift, which the pantograph is required to reach

3.11
maximum width of pantograph head
maximum distance measured along the axis of the track between the outer edges of the contact strips

3.12
mean contact force (F_m)
statistical mean value of the contact force

Note 1 to entry: F_m is formed by the static and aerodynamic components of the pantograph contact force.

[SOURCE: EN 50206-1:2010]

3.13
mechanical kinematic pantograph gauge
maximum gauge of the pantograph head under all operating conditions

Note 1 to entry: Additional information is given in EN 15273-1:2013+A1:2016, Clause 3.

3.14
minimum contact wire height
minimum value of the contact wire height in the span to avoid arcing between one or more contact wires and vehicles in all conditions

[SOURCE: EN 50119:2013]

3.15
neutral section
section of a contact line provided with a sectioning point at each end, to prevent successive electrical sections differing in voltage or phase being connected together by the passage of current collectors

[SOURCE: IEC 60050-811:1991, 36-16]

3.16
nominal contact wire height
nominal value of the contact wire height at a support in normal conditions

[SOURCE: EN 50119:2013]

3.17
non-continuous pantograph head profile
pantograph head with collector strips separately (independently) suspended from the main horns

3.18
overhead contact line
contact line placed above (or beside) the upper limit of the vehicle gauge and supplying vehicles with electric energy through roof mounted current collection equipment

[SOURCE: IEC 60050-811:1991, 33-02]

3.19
percentage of arcing
proportion of driving time with arcing

3.20
static contact force
vertical force exerted upward by the pantograph head on the overhead contact line, caused by the pantograph-raising device, whilst the pantograph is raised and the vehicle is stationary

3.21
transition zone of pantograph head
range for the transition point between non-independently suspended parts and independently suspended parts of the pantograph head (see Figures 1 to 3)

3.22
working range in height
range of permissible contact wire heights for interaction

3.23
limit of dewirement *bv*
maximum permissible lateral deviation of contact wire position from pantograph head center to prevent dewirement (limit of stability for lateral interaction between contact wire and pantograph, described by the transition point at head profile, where the angle exceed 40° (unit m)

3.24
working range of pantograph head
lateral range of contact point at pantograph head for operation under normal conditions (serviceability)

3.25
reference height
height of contact point used for calculation of lateral position of contact wire at pantograph head

4 Symbols and abbreviations

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

A	inner distance between two adjacent pantographs
A'	outer distance between first and last operating pantographs
A"	inner distance between one and the second following operating pantographs
AC	Alternating Current
b'_h	length of mechanical kinematic pantograph gauge at contact wire height, *h*
$b'_{h,mec}$	width of mechanical kinematic pantograph gauge at reference height for interaction between contact wire and pantograph [m] (inclusive of tolerances of overhead contact line)
$b'_{o,mec}$	width of mechanical kinematic pantograph gauge at maximum verification height of the pantograph gauge in a raised position [m] (inclusive of tolerances of overhead contact line)
$b'_{u,mec}$	width of mechanical kinematic pantograph gauge at minimum verification height of the pantograph gauge in a raised position [m] (inclusive of tolerances of overhead contact line)
$b'_{h,OCL}$	width of mechanical kinematic gauge for serviceability of overhead contact line at reference height for interaction between contact wire and pantograph [m]
$b'_{o,OCL}$	width of mechanical kinematic gauge for serviceability of overhead contact line at maximum verification height of the pantograph gauge in a raised position [m]
$b'_{u,OCL}$	width of mechanical kinematic gauge for serviceability of overhead contact line at minimum verification height of the pantograph gauge in a raised position [m]
b_v	maximum permissible lateral deviation of contact wire position from pantograph head centre to prevent dewirement (limit of stability for lateral interaction between contact wire and pantograph, described by the transition point at head profile, where the angle exceeds 40°) [m]

b_w	half-length of the pantograph head [m]
$b_{w,c}$	half-length of the pantograph head conducting length (with insulating horns) or working length (with conducting horns) [m]
$b'_{h,OCL}$	width of mechanical kinematic gauge for serviceability of overhead contact line at reference height for interaction between contact wire and pantograph [m]
d	dimension over wheel flanges [m]
d_{cant}	lateral deviation of contact wire position by vertical uplift at tracks with cant [m]
d_{instl}	tolerance of static lateral position of contact wire ~~height~~ [m]
d_{instv}	tolerance of static vertical position of contact wire [m]
d_l	permissible lateral deviation of contact wire from track centre line [m]
d_{lstab}	permissible lateral deviation of contact wire from track centre for stability against dewirement [m]
d_{lserv}	permissible lateral deviation of contact wire from track centre line to meet the serviceability limit state [m]
d_{mess}	tolerance of measurement, measuring errors refer to horizontal position of contact wire [m]
d_{pole}	lateral deviation of contact wire position issued on change of pole deflection under additional load due to wind speed for serviceability in nominal contact wire height [m]
d_{supp}	lateral deviation of contact wire position issued on movement of cantilever for change wire temperature [m]
d_{tens}	lateral deviation of contact wire position issued on reduced tension force of wires considering efficiency of tensioning devices [m]
D	overall length of neutral section as distance between adjacent systems/phases including overlapping parts taking into account the uplift by pantograph passage and insulation clearances [m]
DI'_o	reference cant, which is the maximum value from cant D_0 and cant deficiency I_0 [m]
D'	length of neutral section excluding overlapping parts taking into account the uplift by pantograph passage and insulation clearances [m]
D_0	fixed cant value taken into account by agreement between the rolling stock and the infrastructure with regard to the kinematic gauge [m]
d	length of insulator inserted in contact wire [m]
d_l	lateral deviation of contact wire [m]
DC	Direct Current
e_{po}	pantograph sway at the maximum verification height of the pantograph gauge in a raised position [m]
e_{pu}	pantograph sway at the minimum verification height of the pantograph gauge in a raised position [m]
e_{phref}	pantograph sway at the reference height for interaction between contact wire and pantograph [m]
F_m	mean contact force [N]
F_{max}	maximum contact force [N]
$F_{m,\,min}$	minimum mean contact force [N]
$F_{m,\,max}$	maximum mean contact force [N]
F_{min}	minimum contact force [N]
F_{stat}	static contact force [N]
f_s	maximum uplift of contact wire within the span length [m]