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**Železniške naprave - Stabilne naprave električne vleke in voznih sredstev - Kriteriji za doseganje tehnične združljivosti med odjemnikom toka in kontaktnim vodnikom**

Railway applications - Fixed installations and rolling stock - Criteria to achieve technical compatibility between pantographs and overhead contact line

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

Applications ferroviaires - Installations fixes de traction et matériel roulant - Critères techniques d'interaction entre le pantographe et la ligne aérienne de contact

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**Ta slovenski standard je istoveten z: EN 50367:2020/prA1**

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English Version

## Railway applications - Fixed installations and rolling stock - Criteria to achieve technical compatibility between pantographs and overhead contact line

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

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

This draft amendment prA1, if approved, will modify the European Standard EN 50367:2020; it is submitted to CENELEC members for enquiry.

Deadline for CENELEC: 2021-11-19.

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

If this draft becomes an amendment, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

This draft amendment was established by CENELEC in three official versions (English, French, German).

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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.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 50367:2020/prA1:2021) was prepared by SC 9XC, "Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations)", of CLC/TC 9X, "Electrical and electronic applications for railways".

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 Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

**iTeh STANDARD PREVIEW**

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

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## 1 Modifications to Clause 3, Terms and definitions

Replace the introductory text with the following:

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>”

Replace the definition of **3.11 maximum design contact wire height** with the following:

“theoretical contact wire height taking account of tolerances, movements, etc., designed to ensure the maximum contact wire height is not exceeded

[SOURCE: EN 50119:2020, 3.1.5.8]”

## 2 Modification to 5.2.2, Infrastructure gauge for free passage of pantograph

In the fourth paragraph, second sentence (last sentence before Note 2), replace the word “can” with the word “may”.

## 3 Modification to 5.2.3, Contact wire height

In Table 1, Contact wire height and gradient for AC and DC systems, in the last row, last column, replace “No gradient” with “in accordance with EN 50119:2020, Table 12”

## 4 Modification to 5.2.5.1, General

Replace the second sentence after Table 2 “The wind speeds and pantograph head lengths used to calculate the limit of lateral deviation, needs to be defined.” with “The wind speeds and pantograph head lengths used to calculate the limit of lateral deviation shall be defined.”

## 5 Modification to 5.2.7, Neutral sections

Replace the text of the last bullet with “adequate means shall be provided to allow a train that is stopped within the neutral section to be restarted, except for short neutral sections as set out in Annex A, A.1.3.”

## 6 Modification to 6.3, Contact strips

Replace the first sentence after the bullet list “Contact strips of either plain carbon or impregnated carbon with additive material shall be permitted.” with “Contact strips shall be either plain carbon or impregnated carbon with additive material.”

## 7 Modifications to 7.2, Static contact forces and current capacity

Replace the first sentence after the bullet list “The current demand of the train shall comply with the working limits of the overhead contact line as set out in EN 50388:2012.” with “The current demand of the train as set out in EN 50388:2012, 7.1 shall comply with the working limits of the overhead contact line.”

Replace the sentence inside Table 5, last row “The overhead contact line is designed to accept as a minimum the value of current at standstill per pantograph stated here.” with “The overhead contact line shall be designed to accept, as a minimum, the value of current at standstill per pantograph stated in this table.”

Replace the first paragraph after Table 5 with the following:

“For DC systems, the maximum current at standstill shall be assessed in accordance with the test specified in A.3. For DC systems the maximum current at standstill shall be assessed in accordance with the test specified in Annex A.3.

For pantograph assessment, the current at standstill shall be as a minimum, in accordance with Table 5 for interoperable use, or a value in accordance with the specific vehicle consumption.”

After the now third paragraph, ending in “with the maximum current at standstill for this traction unit.”, add the following fourth paragraph:

“For the OCL assessment, the current collected by the pantograph shall be as a minimum, equal to the current in Table 5.”

Rename the Note as “NOTE 1” and add the following Note 2:

“

NOTE 2 The figure for AC railways of 80 A has been derived empirically from experience gained from networks and therefore does not require further testing.”

## 8 Modifications to 7.3, Dynamic behaviour and quality of current collection

Replace the second sentence in the sixth paragraph with: “The values to be achieved by the chosen method are set out in Tables 6, 7 and 8.”

Replace the title of Table 7 “Limits for interaction performance (contact force) in tunnels with cross-sections  $\leq 55 \text{ m}^2$ ” with “Different design limit for maximum mean contact force in tunnels with cross sections  $\leq 55 \text{ m}^2$ ”

In the footer of Table 7, add the following Note:

“

NOTE The factor 1,25 has been derived empirically from experience gained from networks with small tunnels.”

In the first paragraph after Table 7, replace the first sentence with “The overhead contact line shall be designed to accept as a minimum, the value of mean force ( $F_{m,max}$ ) in Tables 6, for small tunnels in Tables 7 and 8.”

In the first paragraph after Table 7, replace the second sentence with “The pantograph shall apply as a maximum the mean force ( $F_{m,max}$ ) in Tables 6 and 7.”

## 9 Modification to 8.1, Requirement for pantograph

Replace the first sentence “The pantograph dropping device and the operating system for the pantograph shall be implemented in accordance with EN 50206-1:2010, 4.7 and Clause 6.” with “The pantograph operating system shall be implemented in accordance with EN 50206-1:2010, 4.7.”

## 10 Modification to 8.2.2, Design of overhead contact lines

In the first paragraph, replace the second sentence “The design distance of the two adjacent pantograph heads, measured centre line to centre line, shall be equal to the values set out in one overhead contact line type ‘A’, ‘B’, or ‘C’ selected from Table 9 for the relevant power supply system.” with “The design spacing of the two adjacent pantograph heads, centre line to centre line, shall be equal or lower than values set out in one overhead contact line type ‘A’, ‘B’, or ‘C’ selected from Table 9 for the relevant power supply system.”

In the third paragraph, replace the second sentence “The simulation shall be done with the upper limit of mean contact force  $F_{m,max}$  calculating standard deviation and uplift at the support.” with “The simulation shall be done and comply in accordance with Clause 7 with the upper limit of mean contact force ( $F_{m,max}$ ) according to Tables 6 and 7. Results shall comply with the requirements for standard deviation and uplift as defined in 7.3.”

Move Note 1 after the third paragraph and delete “1”.

Delete all remaining paragraphs (including Note 2) after this Note and before Table 9.

## 11 Modifications to 8.2.3, Formation of train with multiple pantographs - Arrangement of pantographs

*Replace the first paragraph with:*

“Trains operating with two raised pantographs (complying with this document) are compatible with an overhead contact line type according to Table 9, if the actual distance between the pantographs is greater than or equal to the distance according to Table 9 for the chosen overhead contact line type and the maximum speed. Trains with shorter pantograph distances or more than two raised pantographs shall be assessed in accordance with 7.3.”

*Replace the second paragraph with:*

“Interoperable trains operating with two pantographs raised, that comply with the requirements of 8.2.2 for one overhead contact line type in Table 9, are also considered to comply with another overhead contact line with the same or a higher design speed and the same overhead contact line type.

NOTE This assumes that the other OCL performs equal or better than the OCL used during assessment. For example: a train assessed at 160 km/h on a type A of an AC overhead contact line is considered compliant with another type A of an AC overhead contact line of the same or higher design speed for assessed train speed of 160 km/h.”

*In the third paragraph, replace the words “Traction units” with “Trains”.*

## 12 Modifications to 9.1, General

*Delete the sentence after the Note.*

*Replace the last sentence with “For overhead contact lines with a design speed up to 100 km/h, simulation and measurements of the dynamic behaviour (are not required).”*

## 13 Modification to 9.2.1.1, Simulation

*In the fourth paragraph, replace the cross-reference “8.2.1” with “8.2.2”*

## 14 Modifications to 9.2.1.2, Measurement

*After the second paragraph, add the following new paragraph:*

“The test shall be performed at maximum design speed with a mean contact force of at least  $F_{m,max}$ . The measured results for uplift and standard deviation of contact force or arcing shall be in accordance with 7.3.”

*Add the following sentences after the now fourth paragraph:*

“Test runs shall be undertaken for the pantograph distances at maximum line speed and for cases with worst results for uplift and standard deviation.

For test runs shorter distances between the pantographs as used in the simulation are permissible.

If it is impossible to do a test run with a pantograph distance of 8 m, a test for up to 15 m distance between the pantographs is permissible for speeds up to 80 km/h.”

## 15 Modifications to 9.2.2, Integration of an assessed OCL into a network

*Change the Note to body text, and replace it with “For speeds up to 120 km/h (AC systems) and up to 160 km/h (DC systems), check of geometry of OCL without measurement of the dynamic behaviour is permitted.”*

*Delete the last sentence in this subclause.*



## 16 Modification to A.1.1, Principle of neutral section

Delete the paragraph "The distance A shall be in accordance with Table 9. It is only interoperable for a pantograph distance A of 200 m. For other distances see Tables B.3 and B.4."

## 17 Modification to A.1.3, Short neutral section

Replace the third paragraph "Values of D shall only be extended beyond 8 m and up to  $\leq 14$  m, with an adequate mean to restart." with "Higher length up to 14 m shall be accepted provided that there is an adequate mean to restart."

## 18 Modifications to A.1.5, Arrangement of pantographs on trains

In the first paragraph, replace the second sentence with "The maximum spacing A' of pantographs within a train shall be less than 400 m."

In the first paragraph, replace the fourth sentence with "The intermediate pantograph may be arranged at any position within this range, but the minimum distance between operating pantographs is shall be 8 m measured between the centreline of each pantograph head."

## 19 Modification to A.2.1, Pantograph head with length of 1 600 mm

Change the Note to body text, and replace it with:

"The interoperable 1 600 mm pantograph head may be allowed to operate at lines designed for 1 450 mm pantograph head, as long as both electrical and mechanical clearances are provided for adequate electrical insulation and mechanical free passage of the pantographs."

## 20 Modifications to A.3.1

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Replace the second sentence "This test is relevant for assessment of pantograph heads equipped with specified contact strips before putting into service." with "This test is relevant for assessment of pantograph heads equipped with specified contact strips as well as for assessment of OCL."

Delete the Note.

Delete the fourth paragraph "This test shall be carried out on a test bench with the complete pantograph configuration as set out in A.3.3.1."

## 21 Modification to A.3.3.1

In the second paragraph after Figure A.8, delete the first and the second sentence.

## 22 Modifications to B.2, National characteristics

In Table B.4, in the row "Minimum and maximum spacing between two operating pantographs (m)", replace formula symbol "L" with "A".

In Table B.4, in the column "SK", in the third row, replace "4,95 - 5,3" with "4,95 - 6,3".

### 23 Modification to D.2.2, Calculation of tolerances of track at the lower verification point

Replace the first incomplete equation with the following:

"

$$\begin{aligned} \sum T_{Tu}^2 = T_{voie}^2 + & \left( \frac{T_D}{L} \cdot h'_u + \frac{T_D}{L} \cdot s'_0 \cdot (h'_u - h'_{co}) \right)^2 + \left( \tan(T_{susp}) \cdot (h'_u - h'_{co}) \right)^2 \\ & + \left( \tan(T_{charge}) \cdot (h'_u - h'_{co}) \right)^2 + \left( \frac{T_{osc}}{L} \cdot s'_0 \cdot (h'_u - h'_{co}) \right)^2 \end{aligned}$$

"

### 24 Modification to D.2.3, Calculation of tolerances of track at the upper verification point

Replace the first incomplete equation with the following:

"

$$\begin{aligned} \sum T_{To}^2 = T_{voie}^2 + & \left( \frac{T_D}{L} \cdot h'_o + \frac{T_D}{L} \cdot s'_0 \cdot (h'_o - h'_{co}) \right)^2 + \left( \tan(T_{susp}) \cdot (h'_o - h'_{co}) \right)^2 \\ & + \left( \tan(T_{charge}) \cdot (h'_o - h'_{co}) \right)^2 + \left( \frac{T_{osc}}{L} \cdot s'_0 \cdot (h'_o - h'_{co}) \right)^2 \end{aligned}$$

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"

### 25 Modification to D.3.2, Calculation of tolerances of overhead contact line

In the first equation, replace "up<sup>2</sup>" with "d<sub>up</sub>".

### 26 Modification to D.4.2, Calculation of tolerances of overhead contact line

In the first equation, replace "up<sup>2</sup>" with "d<sub>up</sub>".

### 27 Modification to D.5, Illustration lateral deviation

In Figure D.1, replace the following symbols:

Replace "up" with "d<sub>up</sub>".

Replace "q<sub>s<sub>i/a</sub></sub>" with "q<sub>s'<sub>i/a</sub></sub>".

Replace "s<sub>i/a</sub>" with "s'<sub>i/a</sub>".

Replace "d<sub>mess</sub>" with "d<sub>meas</sub>".

In Figure D.2, replace the following symbols:

Replace "q<sub>s<sub>i/a</sub></sub>" with "q<sub>s'<sub>i/a</sub></sub>".

Replace "s<sub>i/a</sub>" with "s'<sub>i/a</sub>".

In Figure D.3, replace the following symbols: