



SLOVENSKI STANDARD
oSIST prEN 50317:2024
01-junij-2024

Železniške naprave - Sistemi za odjem toka - Zahteve in veljavnost meritev medsebojnih dinamičnih vplivov med odjemnikom toka in kontaktnim vodnikom

Railway applications - Current collection systems - Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line

Bahnanwendungen - Stromabnahmesysteme - Anforderungen und Validierung von Messungen des dynamischen Zusammenwirkens zwischen Stromabnehmer und Oberleitung

Applications ferroviaires - Systèmes de captage de courant - Prescriptions et validation des mesures de l'interaction dynamique entre le pantographe et la caténaire

Ta slovenski standard je istoveten z: prEN 50317:2024

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ICS:

29.280	Električna vlečna oprema	Electric traction equipment
45.060.10	Vlečna vozila	Tractive stock

oSIST prEN 50317:2024

en

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 50317

April 2024

ICS 29.280; 45.060.10

Will supersede EN 50317:2012; EN
50317:2012/AC:2012; EN 50317:2012/A1:2022

English Version

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dynamischen Zusammenwirkens zwischen Stromabnehmer
und Oberleitung

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2024-07-12.

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.

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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.

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

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

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prEN 50317:2024 (E)**42 European foreword**

43 This document (prEN 50317:2024) has been prepared by CLC/SC 9XC, "Electric supply and earthing systems
44 for public transport equipment and ancillary apparatus (Fixed installations)", of CLC/TC 9X, "Electrical and
45 electronic applications for railways".

46 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)

47 This document will supersede EN 50317:2012 and all of its amendments and corrigenda (if any).

48 prEN 50317:2024 includes the following significant technical changes with respect to EN 50317:2012:

- 49 — changed definitions for "collector head" replaced by "pantograph head" (3.1);
- 50 — changed definitions for "total mean uplift force" replaced by "mean cord force" (3.1);
- 51 — new definition "expansion length" (3.1);
- 52 — changed definitions "arcing" (3.1);
- 53 — added definition for "nominal voltage", "electrical clearance" (3.1);
- 54 — new definition "reference threshold", "measurement threshold" and "reference distance" (3.1);
- 55 — updated abbreviation lists (now 3.2);
- 56 — minimum conditions recorded for measurements (Clause 4);
- 57 — more detailed explanation of measurement of cord forces (Clause 5);
- 58 — measurement of contact force (Clause 6);
- 59 — updated requirements for definitions of requirements;
- 60 — aerodynamic influence, Inertia correction force, Aerodynamic correction force;
- 61 — definition of Dynamic laboratory test of the instrumented pantograph;
- 62 — updated requirements for of measurement results, control section possible acceptable exceptions;
- 63 — measurement of displacement (Clause 7);
- 64 — uplift at the support how to achieve representative results;
- 65 — measurement of times during pantograph lowering (7.5);
- 66 — measurement of arcing (Clause 8);

- 67 — removed wavelength 323 nm – 329 nm;
- 68 — reference threshold values from note to normative;
- 69 — more detailed definition of control section and possible acceptable exceptions;
- 70 — more detailed definition of Adjustment of threshold for the measurement distance.

71 This document has been prepared under a standardization request addressed to CENELEC by the European
72 Commission. The Standing Committee of the EFTA States subsequently approves these requests for its
73 Member States.

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prEN 50317:2024 (E)74 **1 Scope**

75 This document specifies the functional requirements for output and accuracy of measurements of the dynamic
76 interaction between pantograph and overhead contact line.

77 **2 Normative references**

78 The following documents are referred to in the text in such a way that some or all of their content constitutes
79 requirements of this document. For dated references, only the edition cited applies. For undated references,
80 the latest edition of the referenced document (including any amendments) applies.

81 EN 50318:2018,* *Railway applications - Current collection systems - Validation of simulation of the dynamic*
82 *interaction between pantograph and overhead contact line*

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

85 EN 50119:2020, *Railway applications - Fixed installations - Electric traction overhead contact lines*

86 **3 Terms, definitions and abbreviations**87 **3.1 Terms and definitions**

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

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

90 — ISO Online browsing platform: available at <https://www.iso.org/obp>

91 — IEC Electropedia: available at <https://www.electropedia.org/>

92 **3.1.1**93 **pantograph head**94 **pantograph pan**

95 part of the pantograph comprising the contact strips and their mountings, horns and possibly a suspension

96 [SOURCE: IEC 60050-811:2017, 811-32-05]

97 **3.1.2**98 **working area of pantograph head**

99 lateral and vertical range of possible contact points on the contact strips during normal operation

100 **3.1.3**101 **contact point**

102 point of mechanical contact between a contact strip and a contact wire

103 **3.1.4**104 **contact force**

105 <for a pantograph> vertical force applied by the pantograph to the contact wire(s)

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

107 Note 2 to entry: The contact force is measured perpendicular to the contact plane.

* As impacted by EN 50318:2018/A1:2022

- 108 **3.1.5**
 109 **mean contact force**
 110 F_m
 111 statistical mean value of the contact force
- 112 Note 1 to entry F_m is formed by the static and aerodynamic components of the pantograph contact force.
- 113 Note 2 to entry This mean value can be assessed by simulation or measurement over a specified time or distance.
- 114 **3.1.6**
 115 **static contact force**
 116 vertical force exerted upward by the pantograph head on the overhead contact line at standstill
- 117 **3.1.7**
 118 **aerodynamic force**
 119 additional vertical force applied by the pantograph as a result of air flow around the pantograph assembly,
 120 depending upon speed
- 121 **3.1.8**
 122 **aerodynamic correction force**
 123 difference between the sum of cord forces and the sum of sensors forces
- 124 **3.1.9**
 125 **inertia correction force**
 126 inertia of mass between force sensors and the contact point
- 127 **3.1.10**
 128 **standard deviation of contact force**
 129 σ
 130 square root of the sum of the square errors divided by the number of output values minus 1
- 131 **3.1.11**
 132 **statistical minimum of contact force**
 133 value of contact force represented by $F_m - 3 \sigma$
- 134 **3.1.12**
 135 **statistical maximum of contact force**
 136 value of contact force represented by $F_m + 3 \sigma$
- 137 **3.1.13**
 138 **cord force**
 139 measured force in a cord restraining a contact strip at a defined height
- 140 **3.1.14**
 141 **mean cord force**
 142 statistical mean value of cord force measured at the pantograph head, the latter not touching the contact line,
 143 being equal to the sum of static contact force and the aerodynamic force caused by the air at the considered
 144 speed for a given height of contact points
- 145 **3.1.15**
 146 **transfer function magnitude**
 147 magnitude of the ratio between the measured and applied forces of the pantograph and instrumentation
 148 determined by a dynamic excitation of the pantograph, at the pantograph head for a range of frequencies
- 149 **3.1.16**
 150 **tension length**
 151 length of a flexible overhead contact line between two terminating points
- 152 [SOURCE: IEC 60050-811:2017, 811-33-61, modified – “flexible” has been added]

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- 153 **3.1.17**
 154 **expansion length**
 155 <of a rigid overhead contact line> length of a rigid overhead contact line between two terminating points or
 156 expansion joints (dilatation joint)
- 157 **3.1.18**
 158 **expansion joint**
 159 **dilatation joint**
 160 <of a rigid overhead contact line> joint connecting two expansion length of a rigid overhead contact line
- 161 **3.1.19**
 162 **control section**
 163 representative part of the total measuring length, over which the measuring conditions are compliant with
 164 specified conditions
- 165 **3.1.20**
 166 **pantograph current**
 167 current that flows through the pantograph
- 168 **3.1.21**
 169 **arcing**
 170 **arc**
 171 luminous discharge of electricity across an insulating medium, usually accompanied by the partial volatilization
 172 of the electrodes
- 173 Note 1 to entry: A complete sinusoidal current half-cycle is not considered to be an arcing half-cycle.
- 174 [SOURCE: IEC 60050-442:2019, 442-05-65, modified, “arcing” used as preferred term]
- 175 **3.1.22**
 176 **sensitivity curve**
 177 relationship between the power density of the arc in $\mu\text{W}/\text{cm}^2$ and the response of the detector in volts within
 178 the spectral range of interest
- 179 **3.1.23**
 180 **nominal current**
 181 current that flows through one pantograph for nominal power of a tested train at the nominal voltage of the
 182 traction power supply system
- 183 **3.1.24**
 184 **nominal voltage**
 185 <of an electrical installation> value of the voltage by which the electrical installation or part of the electrical
 186 installation is designated and identified
- 187 [SOURCE: IEC 60050-826:2022, 826-11-01]
- 188 **3.1.25**
 189 **electrical clearance**
 190 <of a contact line> minimum distance in air permitted between fixed structures and parts energized at contact
 191 line voltage
- 192 Note 1 to entry: The distance in air is used to provide functional insulation or basic insulation.
- 193 [SOURCE: IEC 60050-811:2017, 811-09-05]
- 194 **3.1.26**
 195 **threshold**
 196 x
 197 surface power density generated by the smallest arc that can be detected at measurement distance