



SLOVENSKI STANDARD
SIST EN 50318:2019/A1:2022

01-julij-2022

Železniške naprave - Sistemi tokovnega odjema - Veljavnost simuliranja medsebojnih dinamičnih vplivov med tokovnim odjemnikom in kontaktnim vodnikom - Dopnilo A1

Railway applications - Current collection systems - Validation of simulation of the dynamic interaction between pantograph and overhead contact line

Bahnanwendungen - Stromabnahmesysteme - Validierung von Simulationssystemen für das dynamische Zusammenwirken zwischen Dachstromabnehmer und Oberleitung

Applications ferroviaires - Systèmes de captage de courant - Validation des simulations de l'interaction dynamique entre le pantographe et la caténaire

[SIST EN 50318:2019/A1:2022](https://standards.iteh.ai/catalog/standards/sist/7fc4cc18-8773-428c-a174-038b1c8c7c1d/sist-en-50318-2019-a1-2022)

Ta slovenski standard je istoveten z: EN 50318:2018/A1:2022

ICS:

29.280 Električna vlečna oprema Electric traction equipment

SIST EN 50318:2019/A1:2022 en

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

SIST EN 50318:2019/A1:2022

<https://standards.iteh.ai/catalog/standards/sist/7fc4cc18-8773-42be-a174-638b1c8c9c1d/sist-en-50318-2019-a1-2022>

EUROPEAN STANDARD

EN 50318:2018/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2022

ICS 29.280

English Version

Railway applications - Current collection systems - Validation of simulation of the dynamic interaction between pantograph and overhead contact line

Applications ferroviaires - Systèmes de captage de courant
- Validation des simulations de l'interaction dynamique
entre le pantographe et la caténaire

Bahnanwendungen - Stromabnahmesysteme - Validierung
von Simulationssystemen für das dynamische
Zusammenwirken zwischen Dachstromabnehmer und
Oberleitung

This amendment A1 modifies the European Standard EN 50318:2018; it was approved by CENELEC on 2022-01-10. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment 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 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

Contents	Page
European foreword.....	4
1 Modification to the whole standard	5
2 Modification to Clause 2, Normative references	5
3 Modification to 3.6, standard deviation.....	5
4 Modification to 3.15, transfer function <of a pantograph>.....	5
5 Modification to 3.21, wave propagation speed of the contact wire.....	5
6 Modification to 3.25, dynamic interaction.....	5
7 Modification to Clause 3, Terms and definitions	5
8 Modification to Clause 4, Symbols and abbreviations	5
9 Modification to 6.1, General requirements	5
10 Modification to 6.2.1, General	6
11 Modification to 6.2.2, Mass – spring – damper – models (lumped parameter models) .	6
12 Modification to 6.2.3, Multi-body models	6
13 Modification to 6.3, Validation of pantograph models.....	6
14 Modification to 7.1, General requirements	6
15 Modification to 7.2, Data requirements	6
16 Modification to 9.3, Contact wire displacement.....	6
17 Modification to 9.4, Pantograph displacement.....	6
18 Modification to 10.3.2, Deviations of pantograph characteristics.....	6
19 Modification to 10.3.3, Deviations of overhead contact line parameters	7
20 Modification to 10.3.4, Deviations of simulation parameters.....	7
21 Modification to 11.4, Reference model results.....	7
22 Modification to A.2.2, Special data for the contact line reference model - AC - Simple	7
23 Modification to A.2.3, Special data for the reference model of contact line AC – Stitched	7
24 Modification to A.2.4, Special data for the reference model of contact line DC – simple	7
25 Modification to B.1, Measurement results of simple AC high speed contact line.....	7
26 Modification to B.1.1.2, Parameters of simulation	7
27 Modification to B.1.1.3, Model parameter and mechanical data of OCL.....	7
28 Modification to B.1.1.4, Geometrical data of overhead contact line	7
29 Modification to B.1.1.6, Support definition	8
30 Modification to B.1.1.7.3, Tension length 3 (first and last span without any droppers, with a Support S on each side).....	10
31 Modification to B.1.2, Pantograph model.....	10
32 Modification to B.2, Measurement results of a stitched AC high speed contact line ..	10
33 Modification to B.2.2.1, Parameters of simulation	10
34 Modification to B.2.2.3, Geometrical data of overhead contact line	11
35 Modification to B.2.2.3, Geometrical data of overhead contact line	11
36 Modification to B.2.2.4, Support data	11

37	Modification to B.2.3 Pantograph data.....	11
38	Modification to B.2.4, Calculated and measured data of OCL-rest position for validation	11
39	Modification to B.3.2.1, Parameters of simulation	11
40	Modification to B.3.2.3, Geometrical data of overhead contact line	11
41	Modification to B.3.2.3, Geometrical data of overhead contact line	11
42	Modification to B.3.2.4, Support data	12
43	Modification to B.3.3, Pantograph data.....	12
44	Modification to Annex C, Relation to TSI assessment process	12
45	Modification to Annex ZZ, Relationship between this European standard and the essential requirements of EU Directive 2008/57/EC [2008 OJ L191] aimed to be covered	16

Figures

Figure C.1 — Assessment of OCL according to TSI ENE	14
Figure C.2 — Assessment of pantograph according to TSI LOC and PAS	15

Tables

Table B.8 — Support definition of tension length 1.....	8
Table B.9 — Support definition of tension length 2.....	9
Table B.10 — Support definition of tension length 3.....	10
Table ZZ.1 — Correspondence between this European Standard, Commission Regulation (EU) N° 1302/2014 concerning the Technical Specification for Interoperability (TSI) relating to the subsystem 'Locomotives and Passenger Rolling Stock' of the rail system in the European Union* and Directive (EU) 2016/797	16
Table ZZ.2 — Correspondence between this European Standard, Commission Regulation (EU) N° 1301/2014 concerning the Technical Specification for Interoperability (TSI) relating to the subsystem 'Energy' of the rail system in the European Union* and Directive (EU) 2016/797	17

<https://standards.iteh.ai/catalog/standards/sist/7fc4cc18-8773-42be-a174-638b1c8c9c1d/sist-en-50318-2019-a1-2022>

EN 50318:2018/A1:2022 (E)

European foreword

This document (EN 50318:2018/A1:2022) has been prepared by CLC/SC 9XC, “Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations)”, of Technical Committee CLC/TC 9X, “Electrical and electronic applications for railways”.

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) 2023-01-10
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2025-01-10

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

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).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

ITeH STANDARD
PREVIEW
(standards.iteh.ai)

[SIST EN 50318:2019/A1:2022](https://standards.iteh.ai/catalog/standards/sist/7fc4cc18-8773-42be-a174-638b1c8c9c1d/sist-en-50318-2019-a1-2022)

<https://standards.iteh.ai/catalog/standards/sist/7fc4cc18-8773-42be-a174-638b1c8c9c1d/sist-en-50318-2019-a1-2022>

1 Modification to the whole standard

Replace “LOC&PAS TSI” by “TSI LOC & PAS”.

Replace “ENE TSI” by “TSI ENE”.

Replace “contact line” by “overhead contact line”.

2 Modification to Clause 2, Normative references

Replace “EN 50119:2009” by “EN 50119:2020”.

Replace “EN 50367:2012, Railway applications — Current collection systems — Technical criteria for the interaction between pantograph and overhead line (to achieve free access)” by “EN 50367:2020, Railway applications - Fixed installations and rolling stock - Criteria to achieve technical compatibility between pantographs and overhead contact line”.

3 Modification to 3.6, standard deviation

After the term “standard deviation” add the specific use between angle brackets “<of contact force>”.

4 Modification to 3.15, transfer function <of a pantograph>

Replace the definition by “ratio of an applied input on pantograph head to the response of the pantograph, depending on frequency”.

5 Modification to 3.21, wave propagation speed of the contact wire

Replace the term in 3.21 by “wave propagation velocity <of the contact wire>”.

6 Modification to 3.25, dynamic interaction

Replace the definition by “behaviour between pantograph(s) and overhead contact line when in contact, described by contact forces and vertical displacements of contact point(s)”.

7 Modification to Clause 3, Terms and definitions

Add the following new entry:

“3.29

height at operating position

vertical distance between actual operating position of the pantograph and pantograph housed height”

8 Modification to Clause 4, Symbols and abbreviations

Add under the fourth line of the subclause “Abbreviations”:

“FFT fast Fourier transformation”

Add under the 9th line of the subclause “Abbreviations”:

“ROCL rigid overhead contact line”

9 Modification to 6.1, General requirements

Replace the last paragraph by “Aerodynamic effects on the pantograph shall as a minimum be considered by adjusting the mean contact force as a function of speed.”.

EN 50318:2018/A1:2022 (E)

10 Modification to 6.2.1, General

In the second paragraph, add to the terms in brackets after “operation height” the term “contact wire height”.

In the NOTE, add after “operation height” the term “, contact wire height”.

11 Modification to 6.2.2, Mass – spring – damper – models (lumped parameter models)

Replace the second bullet point by

“— stiffness characteristics of joints connecting the discrete masses, including any nonlinearity (if applicable);”

Replace the third bullet point by:

“— damping characteristics of joints connecting the discrete masses, including any nonlinearity (if applicable);”

Delete the last bullet point “— application points of static and aerodynamic forces”.

12 Modification to 6.2.3, Multi-body models

Replace the first paragraph by “For multi-body models, the input set out in 6.2.2 and the following input is required:”.

Delete the last bullet point “— application points of static and aerodynamic forces”.

13 Modification to 6.3, Validation of pantograph models

Replace in the fourth paragraph “EN 50367:2012” by “EN 50367:2020”.

Replace the 13th paragraph by “For the calculation of Q, the frequencies with a measured apparent mass below 2 kg shall be excluded.”.

14 Modification to 7.1, General requirements

Replace the third paragraph by “ROCL has very small vertical displacements in operation. The validation of these models and interaction simulations is only possible for the contact force in direct comparison with the measured results.”.

15 Modification to 7.2, Data requirements

Replace the text of the first bullet point by “length of each span, or distance between supports;”.

16 Modification to 9.3, Contact wire displacement

Replace the paragraph after the bullet point by “The time history of the vertical position of the contact wire at any specified point shall be available for output.”

Replace in the third paragraph “EN 50119:2009, 5.10.4” by “EN 50119:2020, 5.10.4.2”.

17 Modification to 9.4, Pantograph displacement

Replace in the second paragraph “EN 50119:2009, 5.10.7” by “EN 50119:2020, 5.10.4.5”.

18 Modification to 10.3.2, Deviations of pantograph characteristics

Replace the title of 10.3.2 by “10.3.2 Permissible changes of pantograph characteristics”.

19 Modification to 10.3.3, Deviations of overhead contact line parameters

Replace the title of 10.3.3 by “**10.3.3 Permissible changes of overhead contact line parameters**”.

20 Modification to 10.3.4, Deviations of simulation parameters

Replace the title of 10.3.4 by “**10.3.4 Permissible changes of simulation parameters**”.

Replace in the first paragraph “EN 50119:2009, 5.2.4” by “EN 50119:2020, 5.2.4”.

21 Modification to 11.4, Reference model results

Replace the third paragraph by “Simulation results shall be filtered in the frequency domain with the defined cut off frequencies.”.

22 Modification to A.2.2, Special data for the contact line reference model - AC - Simple

Replace the first paragraph by “The overhead contact line is defined by a simple catenary equipment with a single contact wire according to Figure A.1.”.

23 Modification to A.2.3, Special data for the reference model of contact line AC – Stitched

Replace the first paragraph by “The overhead contact line is defined by a simple catenary equipment with a single contact wire and stitched catenary suspensions according to Figure A.2.”.

24 Modification to A.2.4, Special data for the reference model of contact line DC – simple

Replace the first sentence in the first paragraph by “The overhead contact line is defined by a simple catenary equipment with twin contact wires (two contact wires suspended from a single catenary wire).”.

25 Modification to B.1, Measurement results of simple AC high speed contact line

Replace the title by “**B.1 Measurement results of simple AC high speed overhead contact line**”.

26 Modification to B.1.1.2, Parameters of simulation

Replace the first sentence of the last paragraph by “The overhead contact line is defined by a simple catenary equipment with a single contact wire and a single catenary wire.”.

27 Modification to B.1.1.3, Model parameter and mechanical data of OCL

In Table B.1, replace “E1” as symbol for Young’s Modulus by “E”.

28 Modification to B.1.1.4, Geometrical data of overhead contact line

Replace the first sentence of the first paragraph by “The overhead contact line is defined by a simple catenary equipment with a single contact wire and a single catenary wire on straight track.”.

EN 50318:2018/A1:2022 (E)

29 Modification to B.1.1.6, Support definition

Replace Table B.8 by the following:

"

Table B.8 — Support definition of tension length 1

Support number	1	2	3	4	5	6	7	8	9	10
Cumulative position [m]	0,00	42,25	86,95	132,25	177,75	222,75	267,75	312,75	357,75	402,75
CW height [m]	6,35	5,63	5,08	5,08	5,08	5,08	5,08	5,08	5,08	5,08
MW height [m]	6,85	6,88	7,08	6,48	6,48	6,48	6,48	6,48	6,48	6,48
CW stagger [m]	-	0,65	0,3	-0,25	0,1	-0,2	0,1	-0,2	0,1	-0,2
MW stagger [m]	-	0,65	0,3	-0,25	0,1	-0,2	0,1	-0,2	0,1	-0,2

Support number	11	12	13	14	15	16	17	18	19	20
Cumulative position [m]	452,25	501,75	551,25	600,75	650,25	699,75	749,25	798,75	848,25	897,75
CW height [m]	5,08	5,08	5,08	5,08	5,08	5,08	5,08	5,08	5,08	5,08
MW height [m]	6,48	6,48	6,48	6,48	6,48	6,48	6,48	6,48	6,48	6,48
CW stagger [m]	0,1	-0,2	0,1	-0,2	0,1	-0,2	0,1	-0,2	0,1	-0,2
MW stagger [m]	0,1	-0,2	0,1	-0,2	0,1	-0,2	0,1	-0,2	0,1	-0,2

Support number	21	22	23	24	25
Cumulative position [m]	947,25	997,25	1047,05	1096,25	1145,25
CW height [m]	5,08	5,08	5,08	5,63	6,35
MW height [m]	6,48	6,48	7,08	6,88	6,85
CW stagger [m]	0,2	-0,15	0,1	0,35	-
MW stagger [m]	0,2	-0,15	0,1	0,35	-

"