



BSI Standards Publication

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

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## National foreword

This British Standard is the UK implementation of EN 50318:2018+A1:2022. It supersedes BS EN 50318:2002, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN/CENELEC text carry the number of the CEN/CENELEC amendment. For example, text altered by CEN/CENELEC amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee GEL/9/3, Railway Electrotechnical Applications - Fixed Equipment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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#### **Amendments/corrigenda issued since publication**

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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 10 January 2022. 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.

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## Annex ZZ (informative)

### **Ⓐ) Relationship between this European Standard and the Essential Requirements of EU Directive (EU) 2016/797 aimed to be covered**

This European Standard has been prepared under a Commission’s standardization request “M/483 Mandate to CEN and CENELEC for Standardisation in the field of interoperability of the rail system” to provide one voluntary means of conforming to (parts of) Essential Requirements of Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on interoperability of the rail system (recast) as specified in the relevant technical specifications for interoperability (TSI).

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in [Table ZZ.1](#) for “Locomotives and Passenger Rolling Stock”, and [Table ZZ.2](#) for “Energy” confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive as specified in the technical specifications for interoperability (TSI), and associated EFTA regulations.

**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**

Essential Requirements of Directive (EU) 2016/797	Clauses of the Annex to the Technical Specification for Interoperability (TSI)	Clause/ subclauses of this European Standard	Comments
Section 3 of the Annex to the TSI indicates the correspondence between the TSI clauses and the Essential Requirements of Directive (EU) 2016/797	4.2.8.2.9.7 (3) limited to identification of the poorest performing pantograph	6, 8	
	6.1.3.7 (3) limited to current collection quality and mean contact force	6, 7, 9	
<b>* As amended by Commission Regulation (EU) No 919/2016, Commission Implementing Regulation (EU) 868/2018, Commission Implementing Regulation (EU) 2019/776 and Commission Implementing Regulation (EU) 2020/387</b>			
NOTE The Technical Specification for Interoperability (TSI) can refer to other clauses of this standard making the application of those clauses mandatory. Possible references to such clauses are found in the Appendix J to the TSI.			

**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**

Essential Requirements of Directive (EU) 2016/797	Clauses of the Annex to the Technical Specification for Interoperability (TSI)	Clause/ subclauses of this European Standard	Comments
Section 3 of the Annex to the TSI indicates the correspondence between the TSI clauses and the Essential Requirements of Directive (EU) 2016/797	6.1.4.1 (2)	6, 7, 8, 9	
<b>* As amended by Commission Implementing Regulation (EU) 2018/868 and Commission Implementing Regulation (EU) 2019/776.</b>			

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Essential Requirements of Directive (EU) 2016/797	Clauses of the Annex to the Technical Specification for Interoperability (TSI)	Clause/ subclauses of this European Standard	Comments
NOTE The Technical Specification for Interoperability (TSI) can refer to other clauses of this standard making the application of those clauses mandatory. Possible references to such clauses are found in the Appendix E to the TSI.			

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the products falling within the scope of this standard. <sup>A1</sup>

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## 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 (dop) 2023-01-10 implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards (dow) 2025-01-10 conflicting with this document have to be withdrawn

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.

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## 1 Scope

Simulation techniques are used to assess the dynamic interaction between overhead contact lines and pantographs, as part of the prediction of current collection quality. This document specifies functional requirements for the validation of such simulation methods to ensure confidence in, and mutual acceptance of the results of the simulations.

This document deals with:

- input and output parameters of the simulation;
- comparison with line test measurements, and the characteristics of those line tests;
- validation of pantograph models;
- comparison between different simulation methods;
- limits of application of validated methods to assessments of pantographs and overhead contact lines.

This document applies to the current collection from an overhead contact line by pantographs mounted on railway vehicles. It does not apply to trolley bus systems.

## 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. <sup>A1</sup>

EN 50119:2020, *Railway applications — Fixed installations — Electric traction overhead contact lines* <sup>A1</sup>

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*

<sup>A1</sup> EN 50367:2020, *Railway applications — Fixed installations and rolling stock — Criteria to achieve technical compatibility between pantographs and overhead contact line* <sup>A1</sup>

## 3 Terms and definitions

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

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

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

NOTE Further definitions from the Normative References can be used.

### 3.1 contact point

⟨for a pantograph⟩ location of mechanical contact between a pantograph contact strip and a contact wire

### 3.2 contact force

⟨for a pantograph⟩ vertical force applied by a pantograph to the contact wire(s)

NOTE The contact force is the sum of the forces of all contact points of a pantograph.