

# SVENSK STANDARD

## SS-EN 16185-2:2014+A1:2019

Järnvägar – Bromssystem hos motorvagnståg –  
Del 2: Provningsmetoder

Railway applications – Braking systems of multiple unit trains –  
Part 2: Test methods



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Europastandarden EN 16185-2:2014+A1:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 16185-2:2014+A1:2019.

Denna standard ersätter SS-EN 16185-2:2014, utgåva 1.

The European Standard EN 16185-2:2014+A1:2019 has the status of a Swedish Standard. This document contains the official version of EN 16185-2:2014+A1:2019.

This standard supersedes the SS-EN 16185-2:2014, edition 1.



EUROPEAN STANDARD

**EN 16185-2:2014+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Supersedes EN 16185-2:2014

English Version

## Railway applications - Braking systems of multiple unit trains - Part 2: Test methods

Applications ferroviaires - Systèmes de freinage pour  
trains automoteurs - Partie 2 : Méthodes d'essai

Bahnanwendungen - Bremssysteme für Triebzüge -  
Teil 2: Prüfverfahren

This European Standard was approved by CEN on 13 October 2014 and includes Amendment 1 approved by CEN on 9 September 2019.

CEN 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. 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 CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

**SS-EN 16185-2:2014+A1:2019 (E)**

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## SS-EN 16185-2:2014+A1:2019 (E)

### European foreword

This document (EN 16185-2:2014+A1:2019) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2020 and conflicting national standards shall be withdrawn at the latest by May 2020.

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

This document includes Amendment 1 approved by CEN on 9 September 2019.

This document supersedes EN 16185-2:2014.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

This series of European Standards *Railway applications — Braking systems of multiple unit trains* consists of:

- *Part 1: Requirements and definitions;*
- *Part 2: Test methods.*

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



## 1 Scope

This European Standard specifies test methods and acceptance criteria for a brake system for use in self propelling thermal and electric trains, in the following document called EMU/DMU, operating on routes of the European conventional rail system network.

This European Standard is applicable to:

- all new vehicles designs of self-propelling thermal and electric trains;
- all major overhauls of the EMU/DMU if they involve redesigning or extensive alteration to the brake system of the vehicle concerned.

This European Standard does not cover:

- locomotive hauled trains which are specified by EN 14198;
- mass transit rolling stock which is specified by EN 13452 (all parts);
- high speed trains being operated at speeds greater than 200 km/h which are specified by EN 15734-1 and tests in EN 15734-2.

The functional testing requirements set out in this European Standard assume the vehicles are fitted with brake system architecture as defined in EN 16185-1.

The braking performance obtained by applying the tests defined in this European Standard can be used to assess compliance with the required braking performance as defined in EN 16185-1.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14478:2005, *Railway applications — Braking — Generic vocabulary*

EN 15595, *Railway applications — Braking — Wheel slide protection*

EN 15663, *Railway applications — Definition of vehicle reference masses*

EN 15734-2:2010<sup>1)</sup>, *Railway applications — Braking systems of high speed trains — Part 2: Test methods*

EN 16185-1:2014, *Railway applications — Braking systems of multiple unit trains — Part 1: Requirements and definitions*

EN 16207:2014, *Railway applications — Braking — Functional and performance criteria of Magnetic Track Brake systems for use in railway rolling stock*

EN 16334, *Railway applications — Passenger Alarm System — System requirements*

EN 50128, *Railway applications — Communication, signalling and processing systems — Software for railway control and protection systems*

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<sup>1)</sup> This document is currently impacted by the corrigendum EN 15734-2:2010/AC:2012.

## SS-EN 16185-2:2014+A1:2019 (E)

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

EN 16834:2019, *Railway applications — Braking — Brake performance*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478 and the following apply.

#### 3.1

##### **test(ing) institute**

institute that conforms to EN ISO/IEC 17025

#### 3.2

##### **check**

test performed as a discrete verification and/or visual inspection

#### 3.3

##### **measurement**

results recorded numerically, graphically or electronically

#### 3.4

##### **type test**

test of one or more devices, system or complete vehicle demonstrating that the design meets the required specifications and the relevant standards

#### 3.5

##### **routine test**

vehicle test that is performed during or after manufacture to confirm conformity to specified criteria

#### 3.6

##### **application force**

the force applied at the friction interface (e.g. the force between brake pad and brake disc, or between brake block and wheel tread, etc.)

#### 3.7

##### **equivalent response time**

sum of delay time and half of the brake force build-up time or brake force release time if some conditions are respected

[SOURCE: EN 14478:2005]

Note 1 to entry: The term is explained in EN 14531-1.

#### 3.8

##### **application force release time**

period of time commencing when the application force has reduced to 95 % of the stabilised application force and ending when 5 % of the stabilised application force has been achieved

#### 3.9

##### **response time**

a) sum of the delay time and the application force build-up time during brake application, and

b) sum of the delay time and the application force release time during brake release

## 4 Symbols and abbreviations

For the purpose of this document, the following symbols, units and abbreviations apply:

ATC	Automatic Train Control
ATP	Automatic Train Protection
BC	Brake Control
BP	Brake Pipe
DP	Data Processing
DMU	Diesel Multiple Unit
EMU	Electric Multiple Unit
EP	Electro-Pneumatic Brake
ETCS	European Train Control System
MRP	Main Reservoir Pipe
MTB	Magnetic Track Brake
MU	Multiple Unit
R	Brake mode R
R+Mg	Brake mode R+Mg
SHS	Safety loop (German: Sicherheitsschleife)
Sifa	Driver's vigilance control (German: "Sicherheitsfahrerschaltung")
WRMS	Wheel Rotation Monitoring System
WSP	Wheel Slide Protection System
1 bar	= $10^5 \text{ N/m}^2 = 10^5 \text{ Pa} = 10^{-1} \text{ MPa}$

## 5 Requirements

### 5.1 General

The tests defined in this European Standard shall be carried out and the results used to verify that the braking performance and functions of the MU brake system, as a minimum, comply with the requirements of EN 16185-1. This document identifies relevant data to be documented.

This document defines the static and dynamic tests required for the following phases:

- type tests which demonstrate that the brake system conforms to the requirements in all respects; these tests are carried out using a MU that is representative of the design/type of the MU being approved;
- routine tests which are carried out on each and every example of the approved design/type of MU in order to confirm the technical stability of the production processes; for this purpose only the basic features and functions of the system and its sub-systems are verified.

It is expected that tests for the purpose of vehicle acceptance are strictly selected from the list of type tests and performed by a body accredited in accordance with EN ISO/IEC 17025.

The type and routine tests are as follows: