



SLOVENSKI STANDARD

SIST EN 15806:2010

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Železniške naprave - Zavore - Statični zavorni preskusi

Railway applications - Braking - Static brake testing

Bahnanwendungen - Bremse - Statische Bremsprüfung

Applications ferroviaires - Freinage - Essai statique de freinage

Ta slovenski standard je istoveten z: **EN 15806:2010**

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ICS:

45.040 Materiali in deli za železniško Materials and components
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EUROPEAN STANDARD

EN 15806

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Railway applications - Braking - Static brake testing

Applications ferroviaires - Freinage - Essai statique de freinage

Bahnanwendungen - Bremse - Statische Bremsprüfung

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Foreword

This document (EN 15806:2010) 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of an identical text or by endorsement, at the latest by April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

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

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 the Directive 2008/57/EC.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

The objective of this European Standard is to provide a list of static test requirements which are at least to enable compliance with assessment of conformity after manufacturing.

This European Standard covers the static brake type and routine testing of brake systems used in railway vehicles. Only routine tested components may be used.

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1 Scope

This European Standard specifies generic static tests requirements for the braking systems for all types of railway vehicles. Hereinafter all references to tests are to be read as “static” tests.

The methods of test and acceptance criteria are described in the appropriate standards (as example, for High speed trains, FprEN 15734-1 and FprEN 15734-2 apply).

Static tests conducted in normal service before the departure of the train are not considered in this standard.

This European Standard is applicable to brake systems on:

- all new vehicle designs of vehicles;
- all new constructions of existing vehicle types;
- all major overhauls of the above-mentioned vehicles if they involve redesigning or extensive alteration to the brake system of the vehicle concerned.

This European Standard does not apply to special transport systems (suspended monorail, rack and pinion lines, etc.), nor to investigative and supplementary tests.

Annex A presents the components and sub-systems to be incorporated in the brake system considered.

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2 Normative references

The following referenced documents are indispensable for the application 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.

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 50125-1 *Railway applications — Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

ISO 8573-1, *Compressed air — Part 1: Contaminants and purity classes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478:2005 and the following apply.

3.1

brake test

test which aims to prove that a brake system complies with the requirements in terms of function and performance

NOTE The brake tests may comprise:

- type test;
- routine tests.

EN 15806:2010 (E)**3.2****static tests**

tests that are carried out whilst the vehicles and/or train are stationary and that may be part of the tests for the acceptance of a rail vehicle into service

NOTE Vehicle movements could occur at certain times during the testing (for example, during parking brake tests axle speed sensors tests).

3.3**train**

single vehicle or a number of coupled vehicles operating on a guided ground transport system

3.4**type test**

test of single devices, brake control circuits and complete brake systems on a complete vehicle or a train, to verify that the function and performance complies with the requirements specified for the type of vehicle or train concerned

3.5**routine test**

test of the brake system to which each and every vehicle or train is subjected, after manufacture, in order to verify that it complies with the relevant criteria for the type of vehicle or train concerned

3.6**interface specification**

specification describing the functional and component requirements to assure that the different brake sub-systems are able to operate together in the whole brake system (e.g. signal structure, pressure values, timing values)

3.7**stakeholders**

bodies involved with the train design, train procurement, train maintenance, trains testing, etc. (e.g. notified body, train manufacturer, brake supplier, train operator, etc)

3.8**brake system specification**

all points which shall be described in a brake system specification and containing at least the following requirements:

- a) List of relevant documents:
 - 1) European directives
 - 2) European standards
- b) Brake system requirements:
 - 1) Application and release timings
 - 2) Brake performance
 - 3) Load criteria
 - 4) Operational requirements
 - 5) Brake system failure consequences
 - 6) Brake control properties
 - 7) Train signalling / communication

- 8) Monitoring facilities
- 9) Adhesion criteria
- 10) Testing procedure
- 11) Isolating facilities

4 Symbols and abbreviations

WSP	Wheel Slide Protection
G	Good
P	Passenger
R	Rapid (High performance)
R+Mg	Rapid + magnetic track brake

5 Test requirements

5.1 General

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5.1.1 General test requirements

Prior to carrying out the requirements of the following brake system tests the vehicle/train shall have successfully completed the testing of all vehicle systems which interface with the brake system e.g. vehicle control systems, WSP systems, etc. and all wiring tests.

With a pre-serial unit or first vehicle/train of a serial production, type tests shall demonstrate that the brake system complies with the requirements. After successful passing of the type tests, routine tests shall confirm the technical stability of the production process of the system and its subsystems on subsequent trains following manufacture or modification as applicable. For this purpose, the final design of the system and its subsystems defined during the type test shall be considered. Brake testing shall also be undertaken if the brake system, and/or any other part of the train (e.g. train mass and/or load carried) has been changed from the final approved design referring to type test. (e.g. change of pad quality, shape). For example, this may be achieved by adjusting the settings of the existing brake equipment or installing new equipment, etc.

The content of this type testing, due to a brake design change, shall be agreed according to the modifications implemented.

Before carrying out these tests, the following conditions shall be assured:

- The train brake system has been assembled according to the manufacturer's design specifications;
- All system integration tests that could be carried out in advance of physical fitment of the brake system components to the vehicle/train to confirm their satisfactory interaction have been successfully carried out;
- All necessary component type / routine tests shall have been successfully completed. A non exhaustive list of brake components is given in Annex A.
- Tests associated with energy production (see ISO 8573-1) are supposed to be performed before beginning the static test on the train.

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If more than one brake equipment type is used, the tests shall be conducted on each of these separately and in the used combinations to determine the functionality and response time of each single and combined equipment.

Where interactions between components and or subsystems has not been reliably verified by carrying out bench testing, these interactions shall be verified by testing after they have been integrated on the vehicle concerned.

5.1.2 Type test

Where type tests are deemed necessary they shall be performed on a vehicle or train considered representative of the remainder of the fleet or build of vehicles or trains that use the same type designation. These tests shall take place prior to any of that fleet or build of vehicles entering service and they form the basis of an acceptance of the brake system design.

The principal objectives of these type tests are to verify that the train's braking system and equipment complies with the requirements of brake system specifications and to establish the values of all the relevant parameters as a reference for assessing the dynamic performance.

If a multiple unit operation is required in the brake system specification, a static test shall be performed with a single unit and the longest multiple unit composition.

Where interactions between components and or subsystems has not been reliably verified by carrying out bench testing, these interactions shall be verified by testing after they have been integrated on the vehicle concerned.

5.1.3 Routine tests

Routine tests are to be carried out on every vehicle to verify conformance with the type-tested vehicle/train.

The principal objective of the routine tests is to verify that each train's braking equipment is consistent with that of the type tested train. All routine tests shall be completed successfully prior to the introduction of that unit or train into service.

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5.2 General environmental conditions

The brake system and braking equipment shall be tested within the ranges of conditions as specified in EN 50125-1.

5.3 Table of tests

Table 1 lists the static tests that shall be carried out for all brake systems unless the nature of the brake system concerned is such that certain tests are not applicable (e.g. electrical tests for systems that do not use electricity as a control or power medium).

The Table 1 identifies the individual tests as stated in 5.4 and whether these tests should be conducted as part of type or routine tests conducted on an individual vehicle or train as applicable. The actual test sequence is at the discretion of the relevant test engineer.

NOTE The applicability of the tests should be agreed between the stakeholders involved.

These tests describe the minimum requirements for a static test.

Braking energy supply sub-systems are those systems used to store and distribute the energy subsequently converted into a force for retarding the train. These sub-systems include main compressors, auxiliary compressors, hydraulic pumps, accumulators, reservoirs, battery charging, auxiliary generators, etc. They are only considered insofar as the interaction they have with the brake system (e.g. the quantity of energy required from these sub-systems as a function of time). Braking energy supply may also be used for communicating the braking application and release commands.

The first three columns on the left in Table 1 describe the tests in terms of functions and what should be checked, and not the order of the tests and not how to proceed. The tests described are not exhaustive. In the two right hand columns the crosses (X) indicate the type tests and routine tests normally carried out. The final content of the type tests and routine tests depend on the status of the train or individual vehicle and/or brake system (e.g. new or modified).

Refer to Annex B for a typical static test as applicable to a vehicle fitted with a conventional UIC type air brake for freight trains.

Table 1 — List of static tests

Clause number	Designation of the tests	Type test	Routine test	T (Train / multiple unit) I (Individual vehicle / single unit)
5.4.2	Availability of energy supply			
5.4.2.2	Energy delivery and storage			
5.4.2.2.2	Charging test	X	X	T / I
5.4.2.2.3	Safety test	X	X	T / I
5.4.2.2.4	Energy supply control	X	X	T / I
5.4.2.2.5	Successive applications of the brake (inexhaustibility)	X		T / I
5.4.2.2.6	Electrical supply test	X	X	T / I
5.4.2.3	Energy loss			
5.4.2.3.2	Main reservoirs and all systems supplied by those reservoirs	X	X	T / I
5.4.2.3.3	Auxiliary/brake supply reservoirs/accumulators, brake cylinders and associated devices	X	X	T / I
5.4.2.3.4	Brake pipe	X	X	T / I
5.4.3	Brake control			
5.4.3.2	Interfaces of the brake system with safety related systems	X	X	T / I
5.4.3.3	Check of brake control signals and resultant reactions	X	X	T
5.4.3.4	Check that the brake application command is not adversely affected by the energy supply during braking	X	X	T
5.4.3.5	Emergency brake: levels, timings and time interlocking	X	X	T
5.4.3.6	Service brake application and release: levels and timings	X	X	T
5.4.3.7	Service brake: graduability, stability and repeatability	X	X	T
5.4.3.8	Loss of control of distributor control reservoir pressure	X	X	T / I
5.4.3.9	Pressure switches or equivalent devices	X	X	T
5.4.3.10	Isolation of sub-systems from the brake system at vehicle level	X	X	T
5.4.3.11	Verifying the effects of variation to system setting (e.g. G/P timings)	X	X	T / I
5.4.3.12	Automatic function – Loss of brake system continuity	X	X	T
5.4.3.13	Automatic function – Critical reduction in stored braking energy	X	X	T
5.4.3.14	Load dependent function	X	X	T / I
5.4.3.15	Effectiveness of brake system protection devices	X	X	T