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Brakes - Direct electro-pneumatic brake - System functionalities



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Foreword

An International Railway Solution (IRS) is a document drawn up by consensus and applied on a voluntary basis which aims to facilitate and harmonise railway operation.

IRSs are gradually replacing UIC leaflets.

Members of the International Union of Railways (UIC) participate in the creation of IRSs, of which they benefit in full. Furthermore, marketing to railway stakeholders contributes to the sharing and harmonisation of good practices, in accordance with UIC's primary goal.

While IRSs do not have the force of law, they are created and published in a professional manner and with technical approval on the basis of UIC procedures, and have full technical legitimacy in the railway sector.

The "General application" section constitutes the heart of the IRS and contains the working group's expertise applicable in the broadest manner. The addition of a "Specific application" aims to cover factors specific to a region, a type of service, etc.

Some provisions shall be implemented in all cases to ensure correct application and maintain the system's cohesiveness. Certain operational circumstances require that specific provisions be systematically applied by all users of the document.

For the purposes of understanding, the user acknowledges that the expression of:

- obligation indicates requirements to be respected in order to comply with the expertise expressed in the document (usually "shall");
- recommendation indicates options that are favourable but not essential (usually "should");
- permission indicates options that are recognised but without consequence (usually "may");
- capacity indicates possibilities from a technical standpoint and not permissions or probabilities (usually "can").

Obligation, recommendation and capacity can be expressed in the negative to indicate prohibiting, non-recommendation and incapacity.

If applicable, notably for the purposes of compliance with a UIC approval, passages that are recommended or mandatory for the cohesiveness of the system will be accompanied by the letters "R" and "MCS" respectively.

This IRS reflects the following UIC working group expertise:

Rail System Forum - Rolling Stock Sector - SET_07 "Braking"

It integrates in full or in part the following UIC leaflets:

- none

It complements the following standards / UIC leaflets:

- see [Reference documents - page 5](#)

The following IRSs constitute a complementary series:

- none

Executive summary

The International Union of Railways (UIC) develops and distributes International Railway Solutions (IRSs) in order to help railway stakeholders, achieve further harmonisation and collaboration.

This IRS aims to specify the functionalities of the direct electro-pneumatic brake (DEP brake - see [Abbreviations and Symbols - page 7](#)). The DEP brake system controls the brake cylinder pressure coming from the air pipe utilising electric or/and electronic technology; a brake pipe is not necessary.

This IRS deals with the system concepts, not on components and products, so type tests are outside of the scope of this IRS.

This IRS does not specify the train braking performance criteria.

It integrates in full or in part the following UIC leaflets:

- none

It aims to complement the following standards/UIC Leaflets:

- see [Reference documents - page 5](#)

Field of application

This IRS covers rail vehicles with a DEP brake system only (without brake pipe) which shall be compatible with rescuing units equipped with an indirect brake system (i.e. UIC brake system).

This IRS is also applicable to vehicles with both a DEP brake system (see [Abbreviations and Symbols - page 7](#)) and a brake pipe.

This IRS applies to fixed formations of train, such as:

- Multiple units (high speed train, long distance, intercity, regional, etc.),
- Suburban and urban rolling stock (applicable only in some geographical areas: see specific applications).

Reference documents

The following documents are cited in this IRS or strongly support its requirements and recommendations:

For dated references, only the edition cited applies.

For undated references, the latest edition of the referenced document (including any amendments) applies.

1. UIC Leaflets

International Union of Railways (UIC)

- [1] *UIC Leaflet 544-1: Brakes - Braking performance*
- [2] *UIC Leaflet 550: Power supply installations for passenger stock*
- [3] *UIC Leaflet 552: Electric power supply for trains - Standard technical characteristics of the train line*

2. European Standards

European Committee for Standardisation (CEN)

- [4] *EN 14198: Railway Applications - Braking - Requirements for the brake system of trains hauled by locomotives*
- [5] *EN 14478: Railway Applications - Braking - Generic Vocabulary*
- [6] *EN 15807: Railway Applications - Pneumatic half couplings*
- [7] *EN 16185-1:2014: Railway Applications- Braking systems of multiple unit trains - Part 1: Requirements and definitions*
- [8] *EN 16185-2: Railway Applications - Braking systems of multiple unit trains - Part 2: Test methods*

European Committee for Electrotechnical Standardization (CENELEC)

- [9] *EN 50121-3-1: Railway Applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle*
- [10] *EN 50121-3-2: Railway Applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus*
- [11] *EN 50126-1: Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 1: Basic requirements and generic process*
- [12] *EN 50126-2: Railway Applications - The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 2: System Approach to Safety*
- [13] *EN 50129: Railway Applications - Communication, signalling and processing systems - Safety related electronic systems for signalling*