

1st edition, 2021-1

**Brakes - Regulations concerning the construction of the  
various brake components - Magnetic track brakes**

**International Railway Solution to be classified in volumes of UIC**

IV - Operating

V - Rolling Stock

**Application:**

With effect from 1st January 2021

All members of the International Union of Railways

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First edition.

This IRS integrates in full the content of former UIC Leaflet 541-06, 2nd edition, dated March 2013.

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## The International Railway Solution

The International Railway Solutions (IRS) are structured in a General Part and in some eventual Application Parts.

The General Part is valid worldwide, while the Application Parts are valid for a specific railway application, based on a geographical or on a service implementation.

The eventual Application Parts may thus be added according to the current needs of the Railway Community.

Structure of the International Railway Solution:

### **IRS 50541-06: Brakes - Regulations concerning the construction of the various brake components - Magnetic track brakes**

|                     |
|---------------------|
| <b>General Part</b> |
|                     |

## CONTENTS

|                             |   |
|-----------------------------|---|
| Foreword .....              | 1 |
| Summary .....               | 2 |
| Normative references .....  | 3 |
| Terms and definitions ..... | 4 |
| List of abbreviations ..... | 5 |

## General Part

|                                                                                       |    |
|---------------------------------------------------------------------------------------|----|
| 1 - Efficiency .....                                                                  | 7  |
| 2 - Design characteristics .....                                                      | 8  |
| 2.1 - Mechanical characteristics .....                                                | 8  |
| 2.2 - Electrical Characteristics .....                                                | 11 |
| 2.3 - Characteristics of the MTB using permanent magnets .....                        | 12 |
| 2.4 - Pneumatic characteristics for the use of MTB in coaches .....                   | 12 |
| 3 - Notes for the guidance of operators .....                                         | 13 |
| Appendix A - Example showing a diagrammatic arrangement of the MTB on a bogie .....   | 14 |
| Appendix B - Figures .....                                                            | 15 |
| Appendix C - End elements of MTB .....                                                | 17 |
| Appendix D - List of MTB end elements approved for use in international traffic ..... | 18 |
| Appendix E - Characteristics to be checked during the in-service test .....           | 19 |

## Foreword

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

While the application of this IRS is optional, 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" in the present);
- recommendation indicates options that are favourable but not essential (usually "should" in the present);
- permission indicates options that are recognized but without consequence (usually "may", "need not" in the present);
- capacity indicates possibilities from a technical standpoint and not permissions or probabilities (usually "can" in the present).

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:**

B126.541-06

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

UIC Leaflet 541-06

## Summary

The magnetic track brake (MTB) is an additional brake acting directly on the rail and its operation is thus independent of rail/wheel adhesion. Its action is based on the applied magnetic force. The force applied is produced by the electromagnetic effect or by a permanent magnet. Where required, the MTB is fitted to vehicle bogies in order to supplement the air brake. The obligatory requirements of this leaflet apply to this rolling stock only. Appendix A shows as an example a diagrammatic arrangement for the MTB as fitted to a bogie.

## Normative references

### 1. UIC Leaflets

#### **International Union of Railways (UIC)**

*UIC Leaflet 505-1: Railway transport stock - Rolling stock construction gauge*, 10th edition, May 2006

*UIC Leaflet 518: Testing and approval of railway vehicles from the point of view of their dynamic behaviour - Safety - Track fatigue - Running behaviour*, 4th edition, October 2009

*UIC Leaflet 543: Brakes - Regulations governing the equipment of trailing stock*, 15th edition, January 2018

*UIC Leaflet 545: Brakes - Inscriptions, marks and signs*, 10th edition, December 2014

*UIC Leaflet 550: Power supply installations for passenger stock*, 11th edition, April 2005

### 2. European Standards

#### **European Committee for Standardization (CEN)**

*EN 16207: Railway applications - Braking - Functional and performance criteria of magnetic track brake systems for use in railway rolling stock*, November 2014

## Terms and definitions

### **Attractive force**

Force, which attracts the magnets to the rail (this force is caused by the magnets).

### **End elements**

Guide the magnets on the rails.

### **Friction plate**

Part of the pole element.

### **Intermediate elements**

See definition of "pole element(s)".

### **Lateral force**

Force in lateral direction of the vehicle, caused by the MTB in working position.

### **Pole element(s)/shoe(s)**

Friction element(s) of the magnet that produce the braking force.

### **Raised (rest) position**

Position of the MTB in which the magnets are suspended at a significant distance from the rail surface, unless a brake application command has been issued and in which position the magnet is guided and positioned by the bogie.

### **Working (operative) position**

Position of the MTB in which the magnets are in contact with the rail where it centres itself, due to the action of the magnetic field and in which, when the magnet is energised, the brake force is produced by friction.