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**Railway infrastructure — Rail  
fastening systems —**

**Part 7:  
Test method for clamping force and  
uplift stiffness**

*Infrastructure ferroviaire — Systèmes de fixation du rail —*

*Partie 7: Méthode d'essai pour la détermination de l'effort  
d'application au patin du rail et la rigidité au soulèvement*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 269, *Railway applications*, Subcommittee SC 1, *Infrastructure*.

A list of all parts in the ISO 22074 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Railway infrastructure — Rail fastening systems —

## Part 7:

## Test method for clamping force and uplift stiffness

### 1 Scope

This document specifies the laboratory test procedure for determining the clamping force exerted by the fastening system on the foot of the rail by measuring the force to separate the rail foot from its immediate support. When required, the procedure is also used to determine the uplift stiffness of the fastening system.

It is applicable to systems with and without baseplates on all types of sleepers, bearers or elements of ballastless track. The test does not determine the security of the fastening components fixed into the sleeper or other fastening system support.

This test procedure applies to a complete fastening assembly. It is not applicable to fastening systems for embedded rail or other fastening systems which do not act on the foot of the rail.

### 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.

ISO 7500-1:2018, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 22074-1, *Railway infrastructure — Rail fastening systems — Part 1: Vocabulary*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22074-1 apply.

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

### 4 Symbols

| Symbol           | Description  | Unit |
|------------------|--|------|
| $d$              | for direct fastening systems – vertical displacement of the rail relative to the sleeper<br>for indirect fastening systems – vertical displacement of the rail relative to the baseplate | mm   |
| $d_{\text{lim}}$ | limiting uplift displacement beyond which the fastening is very stiff (effectively rigid)  | mm   |
| $m_s$            | mass of sleeper or part sleeper and fastening components fixed to it, used in the test   | kg   |
| $m_f$            | mass of loading frame supported by the sleeper   | kg   |
| $P$              | vertical load applied to the rail  | kN   |