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## **Metallic materials — Rotating bar bending fatigue testing**

*Matériaux métalliques — Essais de fatigue par flexion rotative de  
barreaux*



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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 164, *Mechanical testing of metals*, Subcommittee SC 4, *Fatigue, fracture and toughness testing*.

The third edition cancels and replaces the second edition (ISO 1143:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- A new [Clause 13](#), Measurement uncertainty, has been added;
- a new [Annex B](#), Example of a test report, has been added.

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).

# Metallic materials — Rotating bar bending fatigue testing

**WARNING** — This document does not address safety or health concerns, should such issues exist, that may be associated with its use or application. It is the responsibility of the user of this document to establish any appropriate safety and health concerns, as well as to determine the applicability of any national or local regulatory limitations regarding the use of this document.

## 1 Scope

This document specifies the method for rotating bar bending fatigue testing of metallic materials. The tests are conducted at room temperature or elevated temperature in air, the specimen being rotated.

Fatigue tests on notched specimens are not covered by this document, since the shape and size of notched specimens have not been standardized. However, fatigue test procedures described in this document can be applied to fatigue tests of notched specimens.

## 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 376, *Metallic materials — Calibration of force-proving instruments used for the verification of uniaxial testing machines*

ISO 1099, *Metallic materials — Fatigue testing — Axial force-controlled method*

ISO 12106, *Metallic materials — Fatigue testing — Axial-strain-controlled method*

ISO 12107, *Metallic materials — Fatigue testing — Statistical planning and analysis of data*

ISO 23718, *Metallic materials — Mechanical testing — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1099, ISO 12106, ISO 12107, ISO 23718 and the following 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/>

### 3.1

#### **fatigue**

process of changes in properties which can occur in a metallic material due to the repeated application of stresses or strains and that can lead to cracking or failure

### 3.2

#### **fatigue life**

$N_f$

number of applied cycles to achieve a defined failure criterion