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**Metallic materials — Fatigue testing —  
Axial force-controlled method**

*Matériaux métalliques — Essais de fatigue — Méthode par force axiale  
contrôlée*



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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 1099 was prepared by Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 5, *Fatigue testing*.

This second edition cancels and replaces the first edition (ISO 1099:1975), which has been technically revised.

## Introduction

This International Standard is intended to provide guidance for conducting axial, constant-amplitude, force-controlled cyclic fatigue tests on specimens of a metal for the sake of generating fatigue-life data (i.e. stress vs. cycles to failure).

Nominally identical specimens are mounted on an axial force-type fatigue testing machine and subjected to the required loading conditions that introduce any one of the types of cyclic stress illustrated in Figure 1. The test waveform shall be of constant amplitude, and sinusoidal unless otherwise specified.

The force being applied to the specimen is along the longitudinal axis passing through the centroid of each cross-section.

The test is continued until the specimen fails or until a predetermined number of stress cycles has been exceeded. (See Clauses 4 and 13.)

The test is typically conducted at ambient temperature (ideally between 10 °C and 35 °C).

**NOTE** The results of a fatigue test may be affected by atmospheric conditions, and where controlled conditions are required, subclause 2.1 of ISO 554:1976 applies.

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# Metallic materials — Fatigue testing — Axial force-controlled method

## 1 Scope

This International Standard specifies the conditions for carrying out axial, constant-amplitude, force-controlled fatigue tests at ambient temperature on metallic specimens, without deliberately introduced stress concentrations. The object of testing is to provide fatigue information, such as the relation between applied stress and number of cycles to failure for given materials at various stress ratios.

While the form, preparation and testing of specimens of circular and rectangular cross-section are described, component testing and other specialized forms of testing are not included in this International Standard.

NOTE Fatigue tests on notched specimens are not covered by this International Standard since the shape and size of notched test pieces have not been standardized. However, fatigue-test procedures described in this standard may be applied to fatigue tests on notched specimens.

## 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.

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 4287:1997, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 4288:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 4965:1979, *Axial load fatigue testing machines — Dynamic force calibration — Strain gauge technique*

ISO 7500-1:2004, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### test diameter

$d$

diametral distance or width of the specimen or test piece where the stress is a maximum

See Figures 3 and 4