



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 3075-2021

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

Issued on: August 20, 2021

Implemented on: March 1, 2022

Issued by: SAMR; SAC

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Foreword

This document was drafted as per the rules specified in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents.

This Part replaced GB/T 3075-2008 Metallic Materials - Fatigue Testing - Axial-Force-Controlled Method. Compared with GB/T 3075-2008, this Part has the technical changes as follows besides the structural adjustments and editorial modifications:

- Add test purpose and NOTE 2 (see Clause 1 of this Edition);
- Add two terms and definitions of "grip diameter" and "specimen length" (see Clause 3 of this Edition);
- Delete the requirements for coaxiality and the corresponding diagrams (see 4.2.3 and Figure 9 of 2008 Edition);
- Change the circular cross-section specimen and the rectangular cross-section specimen

(see Figures 7 and 8 of this Edition; Figures 3 and 4 of 2008 Edition);

--- Add the description of the funnel-shaped specimen (see 5.1 of this Edition);

--- Modify the "changes in material microstructure" and "effects of contaminants" in the specimen processing flow into NOTE (see 6.3.1 of this Edition; 5.3.2.2 and 5.3.2.3 of

2008 Edition);

--- Add schematic diagram for the design of test fixture (see Figure 9 in Clause 5 of this Edition).

This Document uses the redrafting method to modify and adopts ISO 1099:2017 Metallic Materials - Fatigue Test - Axial Force-Controlled Method.

Compared with ISO 1099:2017, this Document has many adjustments in structure.

Appendix A

lists the comparison list of clause numbers between this Document and ISO 1099:2017.

There are technical differences between this Document and ISO 1099:2017. The clauses involved in these differences have been marked by a vertical single line (?) in the outer margin

of the document. The specific technical differences and their reasons are as follows:

--- Regarding normative references, this Document has made adjustments with technical differences to adapt to China's technical conditions. The adjustments are concentrated in Clause 2 "Normative References", and the specific adjustments are as follows:

? Use GB/T 25917.1 that equivalently adopts the international standard to replace ISO 4965-1 (see 6.1 of this Document);

? Use GB/T 16825.1 that equivalently adopts the international standard to replace ISO 7500-1 (see 6.1 of this Document);

? Use GB/T 34104 that modifies and adopts the international standard to replace ISO

23788 (see 6.2 of this Document);

? Add the reference of JJG 556 (see 6.1 of this Document).

--- Add the requirements for the coaxiality of the testing machine (see 6.2 of this Document).

This Document made the following editorial modifications:

--- Add the instructions for S_{max} and S_{min} in Figure 1;

--- Add the Table 1 to express the requirements for the geometric dimensions of the specimens listed in the International Standard 6.1 in the form of a table.

Please note some contents of this Document may involve patents. The issuing agency of this

Document shall not assume the responsibility to identify these patents.

This Document was proposed by China Iron and Steel Association.

This Document shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/TC 183).

Drafting organizations of this Document: Central Iron & Steel Research Institute; Sinotest Equipment Co., Ltd.; Lishi (Shanghai) Instruments Co., Ltd.; Southwest Jiaotong University; Shenzhen Wance Testing Machine Co., Ltd.; China Metallurgical Information and Standardization Research Institute; and NCS Testing Technology Co., Ltd.

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This Document was first-time published in 1982; first-time revised in 2008; it is the second-time revised hereby.

Metallic Materials - Fatigue Testing - Axial Force-
Controlled Method

1 Scope

This document specifies the conditions for conducting axial, constant-amplitude, force-controlled, fatigue tests at ambient temperature on metallic specimens, without deliberately introduced stress concentrations. The object of testing while employing this Document is to provide fatigue information, such as the relation between applied stress and number of cycles

to failure for a given material condition, such as hardness and microstructure, 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

Document.

NOTE 1: Fatigue tests on notched specimens are not covered by this Document since the shape and size

of notched test pieces have not been standardized. However, fatigue-test procedures described in this

Document can be applied to fatigue tests of such notched specimens.

NOTE 2: Throughout this Document, the engineering stress is employed. Engineering stress is defined

as the quotient of the axially applied force to the cross-sectional area of the test specimen at the test

temperature.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates

indicated are applicable to this Document; for the undated documents, only the latest version

(including all the amendments) is applicable to this Document.

GB/T 16825.1 Verification of Static Uniaxial Testing Machines - Part 1 :

Tension/Compression Testing Machines - Verification and Calibration of the Force-Measuring System (GB/T 16825.1-2008, ISO 7500-1:2004, IDT)

GB/T 25917.1 Uniaxial Fatigue Testing Systems - Part 1: Calibration of Dynamic Force (GB/T 25917.1-2019, ISO 4965-1:2012, IDT)

GB/T 34104 Metallic Materials - Verification of the Alignment of Testing Machines (GB/T 34104-2017, ISO 23788:2012, MOD)

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