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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 33812-2017

Metallic material -- Fatigue testing -- Strain-controlled thermomechanical fatigue testing method

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Foreword

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the re-drafting method to modify the use of ISO 12111..2011 (E) "metal material fatigue test strain control thermomechanical fatigue

Labor test method "(English version).

This standard is in line with international standards, the contents of the international standards in the following aspects of the modified and added, and in the text it

The blanks of the terms of the articles are marked with vertical lines.

- Added in Chapter 1 "Note 2. The temperature of the test is generally not more than 1200 ° C";

--- on the normative reference documents, this standard has made a technical differences in the adjustment to meet China's technical conditions, the adjustment of the situation

Is reflected in Chapter 2, "normative reference documents", the specific adjustments are as follows.

* the use of the date of reference to the use of international standards of our standard GB/T 12160-2002 instead of the date of reference

Corresponding international standard ISO 9513;

* Added references to documents GB/T 25917, JJG141, JJG351 and JJG617;

--- delete the note of 3.16;

- Chapter 4 adds the symbols for "parallel length" and "number of cycles", while increasing the flexibility, inelastic, and plasticity of the footer

(See Table 1);

- the relevant provisions for the calibration of the sensor and its associated electrical

appliances (see 5.5);

- Figure 5 and Figure 6 are added in 6.1.2.7.

This standard has made the following editorial changes.

- For ease of use, give Chapter 4 symbols in tabular form (see Table 1), and the typical sample size in 6.1.2.2

(See Table 2), while the ISO standard in Table 1 to Table 3.

This standard is proposed by China Iron and Steel Industry Association.

This standard is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

The drafting of this standard unit. Iron and Steel Research Institute, Beijing Institute of Aeronautical Materials, Metallurgical Industry Information Standards Institute.

Introduction

The fatigue life of the components subjected to both thermal and mechanical effects often draws a great deal of attention to the design engineer. Research materials are subject to heat load and machine

The common method of simultaneous performance of the load is to idealize the state of the key material on the uniaxial specimen. The condition of the test is to circulate

The process is theoretically unchanged in the test section, and the temperature and strain fields are externally applied to control their simultaneous changes. This test is defined as "heat engine

Fatigue test ", often referred to as TMF.

In order to ensure the reliability of the test results and the consistency of the results of different laboratories, in accordance with the uniform standard of the test method to obtain and mining

Set the data is very necessary.

This standard also provides advice on the acquisition and presentation of TMF data.

Metal material fatigue test strain control

Thermal mechanical fatigue test method

1 Scope

This standard specifies the requirements for thermomechanical fatigue tests of uniaxially loaded metal specimens under strain control.

This standard applies to constant mechanical strain and temperature cycling conditions, corresponding to any constant cycle strain ratio and constant temperature - mechanical

Variable phase difference test.

The cycle is usually considered in the category of low cycle fatigue, ie fatigue life Nf <= 105.

Note 1. Appendix A lists the most common cycle type diagrams.

Note 2. The temperature of the test is generally not more than 1200 ° C.

2 normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article

Pieces. For undated references, the latest edition (including all modifications) applies to this document.

GB/T 10623 Mechanical properties test for metallic materials (GB/T 10623-2008, ISO 23718..2007, MOD)

GB/T 12160-2002 Calibration of extensometer for uniaxial test (ISO 9513..1999, IDT)

GB/T 16825.1-2008 Tests for static uniaxial testing machines - Part 1. Tensile and/or pressure testing machines

Inspection and calibration (ISO 7500-1..2004, IDT)

GB/T 25917 Axial afterburner fatigue testing machine Dynamic force calibration (GB/T 25917-2010, ISO 4965. 1979, MOD)

GB/T 26077 Fatigue test of metallic materials - Axial strain control method (GB/T 26077-2010, ISO 12106..2003,

MOD)

JJG141 work with precious metal thermocouple

JJG351 work with cheap metal thermocouple

JJG617 digital temperature indication adjustment

3 terms and definitions

GB/T 10623 and GB/T 26077, as well as the following terms and definitions, apply to this document.

3.1

Stress

Fi/A0 is defined as stress, where Fi is the instantaneous force and A0 is the original cross-sectional area at room temperature.

3.2

Original elevation from originalgaugelength

L0

At room temperature and zero strain, the extensometer measures the length of the sample between points.

Note. This definition avoids the complexity of continuous variations in gauge length due to thermal expansion and cold shrinkage.