NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 38250-2019

Metallic materials - Verification of the alignment of fatigue testing machines

Issued on: October 18, 2019 **Implemented on: May 1, 2020**

Issued by: SAMR; SAC

Table of Contents

Foreword

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

This standard uses the translation method equivalent to ISO 23788.2012 "Metal material fatigue testing machine coaxiality test".

The documents of our country that have a consistent correspondence with the international documents referenced in this standard are as follows.

--- GB/T 16825.1-2008 Inspection of static single-axis testing machines - Part 1. Tensile and/or

Inspection and calibration (ISO 7500-1.2004, IDT).

This standard has made the following editorial changes.

--- Unify the expression of the term "percent bend" in the text, and change "beta" in the text to "B";

--- Fixed the symbol error in Figure 3b), c), changed "W" to "w" and "Wg" to "wg".

This standard was proposed by the China Machinery Industry Federation.

This standard is under the jurisdiction of the National Testing Machine Standardization Technical Committee (SAC/TC122).

This standard was drafted. China National Machinery Testing Equipment Co., Ltd., Shenzhen Wan Testing Equipment Co., Ltd., China Aviation Industry Corporation

Beijing Great Wall Metrology and Testing Technology Research Institute, Jinan Xinguang Testing Machine Manufacturing Co., Ltd., Guangzhou University, Chengde Precision Testing Machine Co., Ltd.

Division, Shenzhen Hua Test Co., Ltd.

introduction

The coaxiality of the test machine in this standard refers to the consistency of the fixture geometry (loading) axis. Any deviation from this ideal state will result in

Load the chain's angle and/or lateral offset (or different axes) (see Appendix A). Different axes are represented by specimens or coaxiality measuring devices (hereinafter referred to as

There is an additional bending stress/strain zone on the "coaxiality sensor"). The bending stress/strain zone is superimposed on the assumed assumed uniformity

Stress/strain field. In a pure torsion test, any different axis will result in an additional bending stress/strain condition for biaxial torsion.

Different axial axes of the load chain have been shown to significantly affect fatigue test results in axial fatigue test systems (see references [1], [2] and

[3]).

The main cause of bending caused by different axes is nothing more than a combination of

the following factors.

---The consistency of the fixture center line is poor;

--- The inherent defect of the sample or the coaxiality sensor itself.

Ideally, the bending component produced by the tester will remain the same for all specimens or concentricity sensors. Sample or coaxiality sensor

The resulting bending component varies from device to device.

Recent studies (see references [4] and [5]) have shown that no matter how fine the sample or sensor is processed, the inherent bending error

Always there. Inherent defects (ie eccentricity and tilt) arise from the geometric asymmetry of the axial centerline of the device and the type of strain gauge selected, installed,

Other measurement errors related to performance. The inherent bending error of the device can be significant, sometimes even exceeding the bending error caused by the different axes of the machine.

This standard eliminates the error caused by the inherent defects of the coaxiality sensor by the following method. Rotating the coaxiality sensor around its longitudinal axis

Turn 180° and subtract its bending component from the measured overall maximum surface bending strain. Therefore, the same material and nominal size are not

With the same device, the same coaxiality measurement results should be given; see the example of Figure 10 in Reference [2].

Test of coaxiality of metal material fatigue testing machine

1 Scope

This standard specifies the coaxiality test method for testing machines using strain gauges.

This standard applies to dynamic uniaxial tension and/or pressure, pure torsion, composite pull and twist, composite pressure twist and composite tension and compression fatigue of metal materials

Labor test machine.

The methods outlined in this standard are general and can be applied to static testers and non-metallic materials.

2 Normative references

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

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

Testing of static uniaxial testing machines for metal materials - Part 1 . Tensile and/or

Inspection and calibration

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Coaxial alignment

Consistency of the forcing axis of the load chain assembly (including the sample).

Note. Failure to meet this consistency results in additional bending moments on the specimen.

3.2

Coaxiality sensor alignmentcel

Strain gauge measuring device for coaxial machine inspection of precision machining test machine.

3.3

Coaxial gauge alignmentgauge

A precision machined mechanism consisting of a pair of split rods and a through stop gauge for fixture compliance inspection.

3.4

Average axial strain averageaxialstrain

Epsilono

The average longitudinal axis strain measured by a set of strain gauges distributed in the same cross section on the surface of the concentricity sensor.

Note. The average axial strain represents the strain at the geometric center of the section.

3.5

Loading chain loadtrain

All parts between the two, including the beam and the drive.

Note. The loading chain includes the sample.

3.6