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

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**Metallic materials -- Sheet and strip -- Biaxial tensile testing
method using a cruciform test piece**

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Foreword

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

This standard uses the redrafted method to modify the use of international standards ISO 16842.2014 "Metal material sheet and ribbon cross-shaped specimens

Biaxial Tensile Test Method (English version).

This standard has more structural adjustments than ISO 16842.2014. This standard and ISO 16842.2014 are listed in Appendix A.

The chapter checklist.

There is a technical difference between this standard and ISO 16842.2014. The terms involved in these differences have passed the margins on its outer side.

The vertical single line () is marked, and Appendix B gives a list of the corresponding technical differences and their causes.

For ease of use, this standard also made the following editorial changes.

The chapter "Symbols and Explanations" has been added, the symbols and descriptions in the corresponding diagrams have been deleted, and the following chapters have been serialized.

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

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

This standard was drafted by. Wuhan Iron and Steel Co., Ltd., Beijing University of Aeronautics and Astronautics, Shougang Group Co., Ltd. Shenzhen Wantest test equipment

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the company.

Introduction

This standard specifies a method for measuring the stress-strain curve of sheet metal when a cross-shaped specimen is used for a biaxial tensile test. this

The standard specifies the shape of the cross-shaped specimen and the position of the strain measurement. The bidirectional tensile tester is described in Appendix C as a typical example.

Should follow the requirements.

The cross-shaped specimen recommended by this standard has the following characteristics.

- a) The measurement area of the cross-shaped specimen ensures that the stress uniformity is sufficiently high, so that the measurement accuracy of the biaxial stress meets the requirements;
- b) The elasto-plastic behavior of the metal sheet can be measured at a fixed stress ratio or strain rate ratio;
- c) There is no out-of-plane deformation encountered in the hydraulic expansion test method;
- d) It is easy to use laser cutting, water cutting or other processing methods to cut the blank from the metal plate.

Metal sheet and strip

Cross-shaped specimen biaxial tensile test method

1 Scope

This standard specifies the terms and definitions, symbols and descriptions, and test principles for biaxial tensile test methods for thin strips of thin metal strips.

Samples, test methods, determination of biaxial stress-strain curves and test reports.

This standard applies to bi-directional stretching of cross-shaped specimens with a plate thickness of not less than 0.1 mm and not more than 0.08 times the arm width of the specimen (see Figure 1).

Test Test for stress-strain curves of sheet metal. The test temperature range is 10°C~35°C. Bidirectional pull under other temperature conditions

Stretch test can also refer to this standard.

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 version (including all amendments) applies to this document.

GB/T 8170 Representation and Determination of Numerical Rounding Rules and Limit Values

GB/T 16825.1 Testing of static uniaxial testing machines - Part 1. Testing and calibration of force measuring systems for tension and/or pressure testing machines

Standard (GB/T 16825.1-2008, ISO 7500-1:2004, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Cruciform specimen cruciform test piece

The recommended specimens for biaxial tensile tests are shown in Figure 1 for their shape and geometry.

3.2

Measurement area gauge area

The middle square area surrounded by the four arms of the cross-shaped specimen is shown in Figure 1.

3.3

Tensile arm tensile arm

The part outside the measurement area on the cross-shaped sample. The function of the stretching arm is to transmit the uniaxial tensile force, making the shape of the cross-shaped measurement area

Orthogonal tensile force, see Figure 1.

3.4

Biaxial tensile tester biaxial tensile testing machine

A tester capable of applying a flat orthogonal tensile force to a cross-shaped specimen (see Appendix C).

3.5

Yield surface yieldsurface

In the stress space, each stress path is connected from the elastic deformation into the plastic deformation of each yield stress point, forming a

The boundary between the elastic zone and the plastic zone is distinguished (see Appendix D).