

Translated English of Chinese Standard: GB/T12160-2019

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 19.060; 77.040.10

N 74

GB/T 12160-2019 / ISO 9513:2012

Replacing GB/T 12160-2002

**Metallic Materials - Calibration of Extensometers Systems
Used in Uniaxial Testing**

金属材料 单轴试验用引伸计系统的标定
(ISO 9513:2012, IDT)

Issued on: October 18, 2019

Implemented on: May 1, 2020

Issued by: State Administration for Market Regulation;

Standardization Administration of the People's Republic of China.

Table of Contents

Foreword	4
Introduction	5
1 Scope	6
2 Terms and Definitions	6
3 Symbols and Designations	6
4 Principle	7
5 Calibration Equipment	7
5.1 Calibration Apparatus	7
5.2 Calibration Traceability	8
6 Pre-calibration Inspection	8
6.1 Objective	8
6.2 Records of the Inspection	8
6.3 Identification of Extensometer System Elements	8
7 Measurement of Extensometer Gauge Length	9
7.1 Fixed Gauge Length Extensometry	9
7.2 Variable Gauge Length Extensometry	9
7.3 Non-contacting Extensometry	10
7.4 Extensometer Gauge Lengths Established Using Setting Gauges	10
8 Calibration Process	10
8.1 Environmental Considerations	10
8.2 Position of the Extensometer	11
8.3 Calibration Increments	11
8.4 Calibration Process	12
8.5 Determination of the Characteristics of the Extensometer System	13
9 Classification of the Extensometer System	14
9.1 Input Data	14
9.2 Analysis of the Data	14
9.3 Classification Criteria	14

9.4 Assessment of the Results	15
10 Uncertainty Determination.....	15
10.1 Uncertainty of the Calibration	15
10.2 Uncertainty Budget Determination	16
11 Extensometer System Calibration Intervals	16
12 Calibration Certificate.....	16
12.1 Mandatory Information.....	16
12.2 Data Presentation	17
Annex A (informative) Uncertainty of Measurement	18
Annex B (informative) Calibration of the Calibration Apparatus	24
Annex C (informative) Example of a Report of the Calibration of Calibration Apparatus	27
Annex D (informative) Examples of Extensometer System Configurations.....	30
Annex E (informative) Laser Extensometry	40
Annex F (informative) Video Extensometry.....	49
Annex G (informative) Full Field Strain Measurement Video Extensometry	54
Annex H (informative) Calibration of a Cross-head Measurement System	57
Bibliography	58

Foreword

This Standard was drafted in accordance with the rules provided in GB/T 1.1-2009.

This Standard serves as a replacement for GB/T 12160-2002 *Calibration of Extensometers Used in Uniaxial Testing*. In comparison with GB/T 12160-2002, apart from editorial modifications, the main technical changes are as follows:

- Terms and definitions are added (see Chapter 2);
- Pre-calibration inspection is added (see Chapter 6);
- Uncertainty determination is added (see Chapter 10);
- Annex A “Example of Extensometer Calibration Range” and Annex B “Parameters for Extensometer Classification” are deleted (see Annex A and Annex B of Version 2002);
- Informative Annexes are added (see Annex A, Annex B, Annex C, Annex D, Annex E, Annex F, Annex G and Annex H).

This Standard uses the translation method in the equivalent adoption of ISO 9513:2012 *Metallic Materials - Calibration of Extensometer Systems Used in Uniaxial Testing*.

This Standard makes the following editorial modification:

- This Standard includes ISO 9513:2012_Cor 1 and corrects some contents of Figure C.1 and Figure C.2.

This Standard was proposed by China Machinery Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee 122 on Testing Machines of Standardization Administration of China (SAC/TC 122).

The drafting organizations of this Standard: SINOTEST Equipment Co., Ltd.; Central Iron & Steel Research Institute; Wuxi Institute of Measurement and Testing; Shenzhen WANCE testing Machine Co., Ltd.; Jilin University; Jilin Institute of Metrology.

The main drafters of this Standard: Yang Zhengwang, Chen Wu, Chen Chao, An Jianping, Zhang Shizhong, Han Dandan, Zhao Hongwei.

The issuing of the previous versions:

- GB 12160-1990, GB/T 12160-2002.

Metallic Materials - Calibration of Extensometers Systems

Used in Uniaxial Testing

1 Scope

This Standard specifies a method for the static calibration of extensometer systems used in uniaxial testing, including axial and diametral extensometer systems, both contacting and non-contacting.

2 Terms and Definitions

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

2.1 Extensometer System

equipment used to measure displacement or strain on the surface of a test piece.

NOTE: for the purpose of this Standard, the term “extensometer system” includes the indicator. Some extensometers indicate strain directly (e.g. laser extensometers or digital image correlation techniques). Other extensometers indicate the change in gauge length of a test piece; this is converted into strain by dividing by the relevant gauge length.

2.2 Gauge Length

portion of a test piece where extension is measured.

3 Symbols and Designations

Symbols used throughout this Standard are given in Table 1 together with their designation.

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----