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

GB/T 15821-2025

Replacing GB/T 15821-1995

Metallic coatings - Methods of measurement of ductility

金属覆盖层 延展性测量方法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 15821-1995 "Method for Measurement of Ductility of Metallic Coatings". Compared with GB/T 15821-1995, except for...

Aside from structural adjustments and editorial changes, the main technical changes are as follows.

- The principles have been added (see Chapter 4);
- Added a method for preparing test pieces (see 5.2.3, 4.1.3 of the 1995 edition);
- Change "accuracy" to "precision" (see 5.3.5.2, 4.2.5.2 in the 1995 edition);
- Added a method to accurately pinpoint the crack initiation point during testing (see 6.2.3);
- The preparation of test pieces has been added (see 6.8.2);
- Added parameters for the punch hole diameter and steel ball diameter to obtain reproducible test results (see 6.8.3);
- Some requirements in the test report have been deleted (see Chapter 8, Chapter 7 of the 1995 edition);
- A comparison table of different testing methods has been added (see 7.1).

This document is modified to adopt ISO 8401:2017 "Methods for measuring the ductility of metallic coatings - Commentary".

Compared with ISO 8401:2017, this document has undergone the following structural adjustments.

- 4.3 corresponds to 4.3, 4.3.1, and 4.3.2 in ISO 8401:2017;
- Appendix A corresponds to Appendix B in ISO 8401:2017, and Appendix B corresponds to Appendix A in ISO 8401:2017.

The following editorial changes have been made to this document.

- This document has been renamed "Method for Measuring the Ductility of Metallic Coatings";
- Some formulas have been supplemented with symbol explanations.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Metallic and Non-metallic Coatings (SAC/TC57).

1 Scope

This document specifies the ductility of metal coatings with a thickness not exceeding 200 μm prepared by electroplating, autocatalytic deposition, or other processes.

General measurement methods.

This document applies to the following methods.

---Tests were conducted using a foil sheet with the coating removed from the substrate (metal coating stripped from the substrate);

---Tests were conducted on a coating layer with a substrate.

This document does not apply to certain coating-specific standard methods. In some cases, specific methods take precedence over those described in this document.

The method is agreed upon in advance by both the supplier and the buyer.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

ductility

The ability of a metal or other covering to withstand plastic deformation and/or elastic deformation without fracture or cracking.

linear elongation

The ratio of the extended portion Δl of the deformed specimen to the original length l_0 .

Note 1: This value is a measure of ductility.

Note 2: This ratio is usually expressed as a percentage.

Note 3: Normally, the test piece will be stretched [see Figure 1a). Through some bending tests, the outer layer of the test piece, i.e., the coating, will be stretched. However, in the bulge test...

In this process, the entire surface of the cover foil is stretched, and the linear elongation is calculated by the reduction in thickness. If only one axial deformation component is used to calculate the material...

The ductility of the foil will lead to incorrect results [see Figure 1b). In these cases, using the increase in surface area to calculate the thinning of the foil is an inaccurate measurement.

A method with good ductility (see Appendix A).