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

GB/T 8642-2025

Replacing GB/T 8642-2002

**Thermal spraying - Determination of tensile adhesive strength
(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 8642-2002 "Determination of Tensile Bond Strength of Thermal Spray Coatings". Compared with GB/T 8642-2002, except for the bonding strength...

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

---The scope of application has been changed (see Chapter 1, Chapter 1 of the 2002 edition);

---Added terms such as bond fracture, cohesive fracture, bond-cohesive fracture, interlaminar bond strength, disc specimen, and reference specimen (see Chapter 3);

---A "General Rules" section has been added (see Chapter 4);

---Specific technical requirements for testing instruments, measuring instruments, and specimen fixing devices have been added (see Chapter 5);

---Added sections on "Specimen Materials," "Preparation of Matrix Blocks and Loading Blocks," "Specimen Pretreatment and Spraying," and "Reference Specimen" (see Chapter 6);

---The sample quantity requirements have been changed (see Chapter 6, Chapter 5 of the 2002 edition);

---Requirements for the testing process have been added (see Chapter 7);

---Added measurement readings and evaluation (see Chapter 8);

---The specific requirements for test reports have been changed (see Chapter 9, Chapter 8 of the 2002 edition);

---Added information on potential problems in sample preparation and testing (see Chapter 10).

This document is modified to adopt ISO 14916:2017 "Determination of tensile bond strength of thermal spray coatings".

Compared with ISO 14916:2017, this document has undergone the following structural adjustments.

---Appendix A corresponds to Appendix B in ISO 14916:2017, and Appendix B corresponds to Appendix A in ISO 14916:2017.

The technical differences between this document and ISO 14916:2017, and the reasons therefor, are as follows.

---ISO 7500-1 (see 5.1) has been replaced by the normatively referenced GB/T 16825.1, and ISO 14917 has been replaced by GB/T 18719.

(See Chapter 9) to adapt to my country's technological conditions and increase operability;

---The requirements for the specimen diameter have been revised (see 6.1) to better suit my country's technical conditions and increase operability;

---The requirements for sample materials have been revised (see 6.2) to better suit my country's technical conditions and increase operability;

---Added normative reference GB/T 11373 (see 6.4), deleted normative reference EN13507 (see 6.4), for to adapt to my country's technological conditions.

The following editorial changes have been made to this document.

---Introductory texts have been added to Figures A.2, A.3, A.4, C.1, and Table C.1 (see Appendix A and Appendix C).

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).

Introduction

The determination of tensile bond strength of thermal spray coatings plays an important role in production quality control, as it can determine the quality of workpiece preparation and spraying.

Are there any deviations in the process?

In tensile bond strength tests, if the coating undergoes cohesive fracture, the tensile bond strength of the coating in the vertical direction is measured.

Analysis of tensile test results can identify the effects of changes in spraying conditions. Microscopic examination of the fracture surface can provide insights for evaluating the coating.

The quality of the microstructure provides further information.

Because the bonding procedure and the properties of the adhesive itself have a significant impact on the test results in tensile testing, these effects are not included in the current version.

To provide a full explanation, the existing version needs to be revised.

Determination of tensile bond strength of thermal spray coating

1 Scope

This document describes a tensile testing method, establishing the application of tensile force to the coating in a direction perpendicular to the coating surface to determine the thermal spray coating properties.

A procedure for determining the tensile bond strength of coatings. Using this procedure ensures the comparability of test results.

This test aims to determine the tensile bond strength between the thermal spray coating and the substrate, or between the underlayer and the toplayer, and the tensile bond strength of the coating system.

The cohesive strength of the relevant coating. In some cases, thermal spray coatings contain two or more layers. The methods specified in this document can also...

Used to determine the tensile bond strength between different coating interfaces of this type of two- or more-layer coating.

This test is sufficient to compare coatings prepared using the same or similar raw materials and thermal spraying processes. The tensile bond strength test cannot provide a definitive conclusion on the effectiveness of the test.

The durability evaluation of coatings in use provides absolute values.

This document is applicable to evaluating the effects of substrate pretreatment, spraying conditions, and process parameters on the tensile bond strength of thermally sprayed coatings, and is also applicable to...

Monitor the consistency of production and coating processes.

Note: This tensile test can also be applied to very thin coatings. Furthermore, selecting an appropriate binder (sheet rather than liquid) can minimize binder usage.

A thermally sprayed coating with a specified porosity is applied. For further details, see 6.5.3. Due to the high bonding strength of the self-fluxing alloy, this tensile test is not applicable.

The bonding strength of the thermally sprayed self-fluxing alloy coating after remelting was determined.