

ICS 81.060.30

CCS Q 30



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

GB/T 44549-2024

**Test method for interfacial bond strength of ceramic materials
at elevated temperatures**

高温条件下陶瓷材料界面黏结强度试验方法

(English Translation)

Issued on: September 29, 2024

Implemented on: April 1, 2025

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Symbols and their physical meanings	
5 Principle	
6 Instruments and Equipment	
6.1 Testing machine	
6.2 Heating furnace	
6.3 Temperature measuring device	
6.4 Data Collection	
6.5 Measuring tools	
6.6 Fixture	
7 Samples	
7.1 Specimen size	
7.2 Sample preparation	
8 Test steps	
8.1 Testing machine and loading speed	
8.2 Sample preparation	
8.3 Measurement of interfacial bonding area	
8.4 Measurement of interfacial tensile bond strength	
8.5 Measurement of interfacial shear bond strength	
9 Result calculation	
9.1 Calculation of interfacial tensile bond strength	
9.2 Calculation of interface shear bond strength	
10 Test Report	
References	

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents"

Drafting is required.

This document is modified to adopt ISO 17095:2013 "Fine ceramics (advanced ceramics, advanced technical ceramics) Ceramic materials high temperature interface adhesion Knot strength test method.

The technical differences between this document and ISO 17095:2013 and their reasons are as follows.

The terms and definitions of fine ceramics in ISO 17095:2013 have been deleted; -ISO 7500-1 was replaced by the normative reference GB/T 16491 to adapt to my country's technical conditions and increase operability (see 6.1);

Change the qualitative description in 6.2.4 of ISO 17095:2013 to a quantitative description, i.e. "The heating rate adjustment range of the heating furnace is 1 °C/min~ 20 °C/min" to increase operability;

The normative reference GB/T 16839.1 replaced IEC 60584-1 to adapt to my country's technical conditions and increase operability (see 6.3.2);

ISO 3611 was replaced by the normative reference GB/T 1216 to adapt to my country's technical conditions and increase operability (see 6.5); -Transfer the contents of 7.1 Note in ISO 17095:2013 to the clause, because the notes cannot contain recommendatory clauses and the contents have certain directives.

It is a guide, so it is retained in Article 7.1 (see 7.1);

Note 4 in 3.2 of ISO 17095:2013 is transferred to 7.2.1 as the main text content. As it is not appropriate to have a recommendation clause in the note, Remain in the terms of 7.2.1 (see 7.2.1);

Change the content of 10 d) in ISO 17095:2013 to "Force vs. Test Time (Displacement) Relationship Diagram", and the original content can be omitted.

Because it is an important reference, it has been deleted and replaced (see Chapter 10).

The following editorial changes were made to this document.

To coordinate with the existing standards, the name of the standard is changed to "Test Method for Interface Bond Strength of Ceramic Materials under High Temperature Conditions"; -Deleted Notes 1, 2 and 3 of 3.2; -Added clauses 8.4.1, 8.4.2, 8.4.3 and 8.4.4; -Added clause numbers 8.5.1, 8.5.2, 8.5.3, 8.5.4.-

1 Scope

This document specifies the test method for measuring the interfacial bond strength of ceramic-ceramic, ceramic-metal and ceramic-glass at elevated temperatures.

This document is applicable to homogeneous bulk ceramics and various whisker-reinforced and particle-reinforced ceramic composites.

It is used for research, quality control, performance characterization and design data collection.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies.

in this document.

GB/T 1216 Outside Micrometer GB/T 16491 Electronic universal testing machine GB/T 16839.1 Thermocouples Part 1: Electromotive force specifications and tolerances (GB/T 16839.1-2018, IEC 60584-1.

2013, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

Cross-bonded sample

The specimen is two rectangular specimens of the same shape and size, bonded together in a cross-shaped form, as shown in Figure 1.

Description of index symbols.

alpha- vertical angle of cross specimen;

b- width of the sample strip;

h- thickness of the sample strip.

Figure 1 Schematic diagram of cross specimen