
Translated English of Chinese Standard: JC/T897-2014

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Filing No.: 48690-2015

Building Material Industry Standard

of the People's Republic of China

JC/T 897-2014

Replacing JC/T 897-2002

Antiseptic function of antibacterial ceramic

(ISO 22196:2011, Measurement of antibacterial activity on plastics

and other non-porous surfaces, MOD)

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Issued on: December 24, 2014

Implemented on: June 1, 2015

**Issued by: Ministry of Industry and Information Technology of the
People's Republic of China.**

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Foreword

This Standard is drafted according to the rules given in the GB/T 1.1-2009.

This Standard replaces the JC/T 897-2002 *Antiseptic function of antibacterial ceramic*. Compared with the JC/T 897-2002, besides the editorial changes, the major technical changes are as follows:

- ADD the “Normative references” (SEE Chapter 2 of this edition);
- DELETE the “Product categories” (SEE Chapter 3 of 2002 edition);
- ADD the “Product marks” (SEE Chapter 4 of this edition);
- ADD the “General requirements” (SEE Chapter 5 of this edition);
- ADD the technical requirements and experimental methods for the permanence of antibacterial (SEE Section 7.3 of Chapter 6 of this edition);
- MODIFY the definitions of “antibacterial” and “antibacterial ceramic” (SEE Sections 3.1 and 3.3 of this edition);
- ADD the “Antibacterial test conditions” (SEE Section 7.1 of this edition);
- MODIFY the detailed provisions on the methods of antibacterial performance test (SEE Appendix A of this edition; Appendix A of 2002 edition).

Appendix A of this Standard modifies-adopts ISO 22196:2011 *Measurement of antibacterial activity on plastics and other non-porous surfaces*.

According to the conditions of microbiological experiments in our country, this Standard makes some modifications when adopting ISO 22196:2011. The relevant technical differences have already been compiled into the Appendix A. The existing major differences are as follows:

- This Standard deletes the “8.3 Calculation of the antibacterial activity” of ISO 22196:2011, and changes it into “A.4.2 Calculation of the antibacterial rate”, which is to consider using the common methods for representing the antiseptic function of our country’s existing products;
- This Standard deletes the Appendixes A and B of ISO 22196:2011;
- This Standard makes some editorial changes to ISO 22196:2011 according to the requirements of national standards.

Antiseptic function of antibacterial ceramic

1 Scope

This Standard specifies the terms and definitions, product marks, general requirements, technical requirements, test methods, and inspection rules of antibacterial ceramic.

This Standard applies to the inspection and determination of the antiseptic function of the ceramic tiles for building and sanitary ceramics with the antibacterial function. Other ceramics can use this Standard for reference.

2 Normative references

The following documents are essential to the application of this document. For dated references, only the versions with the dates indicated are applicable to this document. For undated references, only the latest versions (including all the amendments) are applicable to this document.

GB 4789.2 *National food safety standards – Food microbiological examination: Aerobic plate count*

GB/T 9266 *Determination of scrub resistance of film of architectural paints and coatings*

GB 19489 *Laboratories – General requirements for biosafety*

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Antibacterial

It refers to the generic terms of inhibiting and killing the growth and proliferation of bacteria, saccharomycetes, moulds, and other microorganisms.

3.2 Permanence of antibacterial

SIMULATE the cleaning ways of the products during use. The permanence of antibacterial refers to the antiseptic function after multiple scrub tests.

3.3 Antibacterial ceramic

The laboratories of antibacterial test shall conform to the requirements for laboratory biosafety management and facility conditions specified in the GB 19489.

7.2 Detection of the antiseptic function

The test methods of antiseptic function shall conform to the provisions specified in the Appendix A of this Standard.

7.3 Detection of the permanence of antibacterial

7.3.1 Principle

SIMULATE the cleaning ways of the products during use. USE sodium hypochlorite disinfectant to repeatedly scrub the surfaces of test samples. DETECT the antiseptic function of the surfaces of test samples after scrubbing.

7.3.2 Preparation of test specimens

PREPARE the test specimens according to the Section A.2.4.3. PLACE the glaze layers with the antiseptic function of the six test specimens upwards. FIX them in the middle of the 430mm × 150mm cement fiberboard.

7.3.3 Scrub test

CONDUCT the scrub test according to the GB/T 9266. USE sodium hypochlorite disinfectant with a concentration of 5% as scrubbing solution. SCRUB for 500 times.

7.3.4 Antiseptic function test

CONDUCT the scrub test to the test specimens. REMOVE the test specimens afterwards. USE tap water to fully flush them. USE sterile distilled water to flush them afterwards. PLACE the glaze layers of test specimens upwards. SOAK the green bodies in the sterile water for 18h ~ 24h. ENSURE that the test specimens fully absorb the water. During the test, TAKE out the test specimens. USE sterile dry gauze to wipe the excessive moisture on the surfaces of test specimens. PLACE them in the sterile plate for testing. CONDUCT the antiseptic function test according to the provisions specified in the Appendix A of this Standard.

8 Inspection rules

8.1 Inspection

The technical item specified in the Chapter 6 of this Standard refers to the type

ADD 1,000mL of distilled or deionized water. HEAT for dissolution. USE 0.1mol/L sodium hydroxide (analytical reagent) or 0.1mol/L hydrochloric acid (analytical reagent) solution to adjust the pH to a value between 7.0 and 7.2. After splitting up the solution, PLACE the solution in a pressure steam sterilizer. STERILIZE at 121°C for 30min. If it is not used immediately after preparation, STORE it at 5°C ~ 10°C. The storage duration is 30d.

A.2.2.2.2 Nutrient agar (NA) culture medium

WEIGH 5.0g of beef extract, 10.0g of peptone, 5.0g of sodium chloride, and 15.0g of agar. ADD 1,000mL of distilled or deionized water. HEAT for dissolution. USE 0.1mol/L sodium hydroxide (analytical reagent) or 0.1mol/L hydrochloric acid (analytical reagent) solution to adjust the pH to a value between 7.0 and 7.2. After splitting up the solution, PLACE the solution in a pressure steam sterilizer. STERILIZE at 121°C for 30min. If it is not used immediately after preparation, STORE it at 5°C ~ 10°C. The storage duration is 30d.

A.2.2.2.3 Plate count agar

WEIGH 2.5g of yeast powder, 5.0g of tryptone, 1.0g of glucose, and 15.0g of agar. ADD 1,000mL of distilled or deionized water. HEAT for dissolution. COOL down to room temperature. USE 0.1mol/L sodium hydroxide (analytical reagent) or 0.1mol/L hydrochloric acid (analytical reagent) solution to adjust the pH to a value between 7.0 and 7.2. After splitting up the solution, PLACE the solution in a pressure steam sterilizer. STERILIZE at 121°C for 30min. If it is not used immediately after preparation, STORE it at 5°C ~ 10°C. The storage duration is 30d.

A.2.2.3 Reagents

A.2.2.3.1 Disinfectant

70% ethanol solution.

A.2.2.3.2 Eluent

USE the normal saline containing 0.85% NaCl. ADD 0.2% sterile surfactant (such as Tween 80) to facilitate elution. USE 0.1mol/L sodium hydroxide (analytical reagent) or 0.1mol/L hydrochloric acid (analytical reagent) solution to adjust the pH to a value between 7.0 and 7.2. After splitting up the solution, PLACE it in a pressure steam sterilizer. STERILIZE at 121°C for 30min. If it is not used immediately after preparation, STORE it at 5°C to 10°C. The storage duration is 30d.

A.2.2.3.3 Broth for bacterial suspension

shall be (50 ± 2) mm $\times$ (50 ± 2) mm. The thickness of test specimens shall not be greater than 10mm. TAKE 6 test specimens. If the product cannot be cut into the test specimens with a predetermined size. As long as the film can cover 400mm² to 1,600mm², it can also be considered as an option. When the dimensions of test specimens fail to conform to the standard requirements, GIVE clear indication of actual dimensions in the experimental report. For the special-shaped parts, TAKE samples from the functional surfaces of products. If the products cannot be made into the test specimens meeting the standard requirements, USE same raw materials and process to separately prepare the test specimens. If the dimensions of test specimens differ from (50 ± 2) mm $\times$ (50 ± 2) mm, EXPLAIN the actual dimensions in the experimental report.

A.2.4.4. Preparation before the specimen experiment

Before the experiment, USE 70% medical alcohol to wash and sterilize the test specimens. PLACE the sterilized glaze layers on the surfaces of test specimens upward. SOAK the green bodies in the sterile water for 18h ~ 24h. ENSURE that the test specimens fully absorb the water. During the experiment, TAKE out the test specimens. USE sterile dry gauze to wipe the excessive moisture on the surfaces of test specimens. PLACE them in the sterile plate for standby application.

A.3 Operating procedures

A.3.1 Culture preservation

INOCULATE the strain culture on the slant of the nutrient agar (NA) culture medium. CULTURE at (37 ± 1) °C for 24h. PRESERVE at (5 ± 1) °C (1 month at most) as slant preserved bacteria.

A.3.2 Activation of culture

TRANSFER the slant preserved bacteria to the nutrient agar (NA) plate or slant culture medium. PLACE it in a constant temperature incubator. CULTURE at (37 ± 1) °C for 18h ~ 24h. During the test, USE the fresh bacterial cultures transferred within 24h after two consecutive transfer (3rd generation to 14th generation).

A.3.3 Preparation of bacterial suspension

USE an inoculating loop to taken small amount of (SCRATCH 1 to 2 loops) fresh bacteria from the culture medium described in the Section A.3.2 of this Standard. ADD the bacteria to corresponding broth (A.2.2.3.3). CONDUCT 10-fold gradient dilutions successively. SELECT the diluent with the concentration of bacterium of $(1\sim3) \times 10^4$ CFU/mL as the bacterial solution for test.

- c) Standards in use;
- d) Results, and antibacterial rate;
- e) Differences with the basic procedures, and the observed abnormalities;
- f) Dimensions of the test specimens (when they are different from the standard dimensions);
- g) Test date.

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