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**LIGHT INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Footwear and footwear components - Antimicrobial
performance specifications
(English Translation)**

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1 Scope

This standard specifies the terms and definitions, test environment, sampling, test strains, test method, requirements, determination, identification, and report of antibacterial performances of footwear and footwear components.

This standard applies to footwear and footwear components with antibacterial performance.

2 Normative references

The articles contained in the following documents have become part of this document when they are quoted herein. For the dated documents so quoted, all the modifications (including all corrections) or revisions made thereafter shall be applicable to this document.

GB 4789.2 National food safety standard Food microbiological examination. Aerobic plate count

GB/T 8629-2001 Textiles - Domestic washing and drying procedures for textile testing

GB 19489 Laboratories - General requirements for biosafety

3 Terms and definitions

For the purpose of this standard, the following terms and definitions apply.

3.1 Antibacterial

Annex A (Normative)

Dissolution Test Method (Inhibition-Zone Test)

A.1 Principle

Use antibacterial agent to dissolve out constantly, and form different concentration gradients through agar diffusion, so as to show bacteriostatic action. The test is judged by whether antibacterial agent dissolves out or conforms to dissolution requirements of this standard based on inhibition-zone size.

A 2 Test conditions

A.2.1 Main equipment

Constant temperature incubator (37±1)°C; freezer 5°C~10°C; second-level biological safety cabinet; pressure steam sterilizer; electrically heated drying oven; Vernier calliper; sterile test tubes; sterile pipette; sterile Erlenmeyer flask; inoculating loop; and alcohol lamp.

A.2.2.1 Control samples

It shall be the sterile dry filter paper in round of which the diameter is 15 mm, or in square of which the side length is 15 mm.

A.2.2.2 Samples

It shall be the suitable test samples in round of which the diameter is 15 mm, or in square of which the side length; the thickness is less than 4mm; cut from the antibacterial parts.

A 2.2.3 Sterilization

Sterilize the test sample and control sample before testing. Samples that are not suitable for treatment with disinfectant may be dried directly after being rinsed with sterile water and receiving ultraviolet irradiation for 1 h. Other instruments used in test may be sterilized through hot and humid method OR hot and dry method.

A.2.3.1 Nutrient broth (NB)

Add 5.0 g of beef extract, 10.0 g of peptone, and 5.0 g of sodium chloride to 1000 mL of distilled water. After dissolution by heating, adjust the pH through 0.1 mol/L sodium

Take 0.3 mL of bacterial solution that is prepared based on A.3.3; apply evenly to culture medium; cover with plate; stand for 5 min.

A.4.2 Sample placing

Paste to 3 contamination plates; each plate is pasted with 2 test samples and 2 control samples. Use sterile forceps to paste test sample to plate surface; sample center distance is less than 25 mm, and the distance from plate edge is not less than 15 mm. After pasting in place, use sterile forceps to gently press the samples so that the samples are very close to surface of the plate.

A.4.3 Culture and measurement

Cover the dish and cultivate at $(37 \pm 1)^{\circ}\text{C}$ for 16 h~18 h. Use Vernier calliper to measure inhibition-zone (including sample) and record. Note that growth of some microbes may restore and make bacteriostasis circle smaller if incubation time is too long.

Full transparent inhibition-zone (the widest place in normal direction) shall be selected for inhibition-zone measurement. Measurement diameter shall be bounded by outer edge of inhibition-zone.

A.5 Expression of test results

A.5.1 Control sample shall not generate inhibition-zone, otherwise the test is invalid.

A.5.2 Calculate the inhibition-zone width (D) based on formula (A.1); take arithmetic mean value of 3 samples, and retain 2 significant figures.

Where,

D - Bacteriostatic ring width, in millimeters (mm);

T - Total width of bacteriostatic ring outer edge, in millimeter (mm);

R - Total width of test sample, in millimeter (mm).

B.2.2.3 Sterilization

High-pressure steam sterilization is usually adopted at 115°C for 30 min. For the test samples that are not heat-resisting or that hot and humid disinfection method may easily affect antibacterial performance, other suitable methods may also be used for sterilization.

Sterilization treatment before sample test shall not affect antibacterial performance of test

sample.

B.2.3.1 Nutrient broth culture medium (NB)

See A.2.3.1.

B.2.3.2 Nutrient agar culture medium (NA)

See A.2.3.2.

B.2.3.3 Potato Dextrose Agar (PDA)

Add 200.0 g of peeled and diced potatoes; add 1000 mL of distilled water; boil for 10 min~20 min; filter with gauze; add additional distilled water to 1 000mL. Then add 20.0 g of glucose and 20.0 g of agar; after heating to dissolve and packing, place into pressure steam sterilizer at 115°C for 30 min.

B.2.3.4 Plate count agar (PCA)

Add 2.5 g of yeast extract, 5.0 g of tryptone, 1.0 g of glucose, and 15.0 g of agar to 1000 mL of distilled water or deionized water; place into a conical flask to mix...

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