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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 45174-2024

Footwear - Test method of density for microcellular soles

鞋类 微孔鞋底密度测定法

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Foreword

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA ICS

Footwear - Test Method of Density for Microcellular Soles

1 Scope

GB/T 45174-2024 measures the density of a microcellular shoe sole. Nearly every modern sole is a foam - EVA, polyurethane, rubber compounds blown to a fine cell structure - and its density is the single number that summarises how it was made and predicts how it will behave. A denser foam is more durable and more supportive; a lighter one is more comfortable and cheaper in material, and the difference between the two is invisible. Density is therefore both a quality control measure and a commercial one, since a supplier can lighten a sole quietly. The reason it needs its own method is the word 'apparent': a sole is not a uniform block but a shaped part with a moulded skin, varying thickness and often

more than one material, so the meaningful figure is the mass and volume of the whole sole as it exists, not of a specimen cut from it. This document describes the test method for the apparent density of a complete microcellular sole, and applies to soles made of microcellular materials and composite constructions. It is written for footwear manufacturers, sole suppliers, and the testing laboratories and buyers who verify against a specification.

This Document describes the test method for the apparent density of the entire microcellular sole. This Document is applicable to the determination of the apparent density of the entire sole of microcellular materials and composites with other materials.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 6682-2008 Water for analytical laboratory use - Specification and test methods

GB/T 22049 Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 Apparent density; rho The mass of the entire sole per unit volume.

4 Principle

According to Archimedes' principle, the mass of the specimen in air and water is measured; and the apparent density of the specimen (hereinafter referred to as density) is obtained by calculation.

5 Equipment and Materials

5.2 Water Water of Grade-3 in accordance with GB/T 6682-2008.

6 Specimen and Environmental Adjusting 6.1 The entire sole is used as the specimen.

6.2 Before the test, the specimen shall be adjusted at the temperature of the reference standard environment for at least 4 h in accordance with the provisions of GB/T 22049; and the test shall be carried out in this environment.

7 Test Procedures 7.1 Select a suitable clamp (5.1.4) and install it on the testing device

(5.1). Test and record the mass Ma of the clamp (5.1.4) in the air.

7.2 Immerse the clamp (5.1.4) in water; test and record the mass Mb of the clamp (5.1.4) in water.

7.3 Return the clamp (5.1.4) to the air. Hold the specimen on the clamp (5.1.4); test and record the total mass Mc of the clamp (5.1.4) and the specimen in the air.

7.4 Immerse the specimen and the clamp (5.1.4) in water. The position of the clamp (5.1.4) in water shall be consistent with 7.2; and the specimen shall be completely immersed. During the test, pay attention that the clamp (5.1.4) and the specimen shall not touch the wall and bottom of the water tank (5.1.3). Test and record the total mass Md of the specimen and the clamp (5.1.4) in water. NOTE: Select an appropriate method to remove bubbles on the surface of the specimen.

7.5 Stop the test and calculate the density of the specimen.

7.6 Repeat the test twice according to 7.4~7.5. Finally, take the arithmetic mean of the three test results as the apparent density of the tested sole. NOTE: Choosing to use intelligent testing equipment can simplify the test procedures and calculation process.

8 Test Results

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