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

GB/T 12811-2025

Replacing GB/T 12811-1991

Test method for average cell size of rigid cellular plastics

硬质泡沫塑料平均泡孔尺寸试验方法

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Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Principles
- 5 Instruments
- 5.1 Instruments required for Method A
- 6 Specimen and preparation
- 7 Conditioning
- 8 Test procedure
- 8.1 Method A (Projector method)
- 9 Test results...

1 Scope

GB/T 12811-2025 is the Chinese national standard on test method for average cell size of rigid cellular plastics, in the field of rubber and plastic industries. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 31 October 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 May 2026. Classification: ICS 83.100, CCS G32. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes three test methods for determining the average cell size of rigid cellular plastics by calculating the number of cell wall intersections within a required length. Method A (projector method), Method B (optical microscopy), and Method C (scanning electron microscopy). This document is applicable to the determination of the average cell size of rigid cellular plastics. It is a reference for the determination of the average cell size of other types of cellular plastics.

2 Normative references

The provisions of the following documents constitute the essential clauses of this document

through normative references in this text. Among them, for any dated reference, only the version corresponding to that date applies to this document; for any undated reference, the latest version (including all amendments) applies to this document.

GB/T 2918 Plastics - Standard atmospheres for conditioning and testing

GB/T 6342 Cellular plastics and rubbers - Determination of linear dimensions

3 Terms and definitions

This document does not contain any terms or definitions that need to be defined.

4 Principles

4.1 Method A (Projector method) Cellular plastic is cut into thin sheets with a slicer, the thickness of which does not exceed 1 mm. The image of the sheet is projected onto a screen using a projector. Within a specified length, the number of cells in the cross-section is calculated. The average chord length is then calculated from this number and converted into the average cell size.

4.2 Method B (Optical microscopy) Cellular plastic is cut to make its surface smooth. By observing through an optical microscope, the number of cells on the surface within a suitable length is calculated. The average chord length is calculated from this number and then converted into the average cell size. When the cell walls are thick, the effect of the wall thickness needs to be considered when calculating the average chord length.

4.3 Method C (Scanning electron microscopy) The specimen is prepared by breaking the sample using liquid nitrogen quenching, and a conductive thin layer is sputtered onto the quenched surface of the foam sample. A scanning electron microscope is used to observe the cross-section and calculate the number of cells within a suitable length. The average chord length is then calculated from this number and converted to the average cell size. When the cell walls are thick, the effect of the wall thickness needs to be considered when calculating the average chord length.

5.1 Instruments required for Method A

5.1.1 Cellular plastic slicer. It is capable of cutting thin slices.

5.1.2 Projector. It is capable of displaying a 50 mmx50 mm slide assembly projection.

5.1.3 Transparent plastic thin sheet with standard graduations. The graduation is 30 mm and the division value is no greater than 1 mm.

5.1.4 Slide assembly. Two glass slides are glued together with a tape along one side to form a hinged shape, and a transparent plastic sheet with standard graduations (30 mm in length) is placed in the middle. The counting coordinates are shown in Figure 1. surface of

the foam sample.

5.3.2 Scanning electron microscope. The magnification is greater than or equal to 400x, with the magnification continuously adjustable. It is capable of measuring the straight- line length.

6 Specimen and preparation

6.1 Specimen size and preparation Method A (Projector method). A specimen of approximately 50 mmx50 mm with the original thickness is cut from the test area of the sample using mechanical processing. Method B (Optical microscopy). A specimen of approximately 25 mmx25 mm with its original thickness is cut from the test area of the sample using mechanical processing. Method C (Scanning electron microscopy). The sample is broken using liquid nitrogen quenching, and the specimen size is suitable for the specimen stage of the scanning electron microscope.

6.2 Number of specimens The number of specimens is usually one, but can be determined separately depending on the purpose of the test.

7 Conditioning

Unless otherwise specified in the test material specification, conditioning shall be conducted in accordance with GB/T 2918, with the temperature at $23\text{ }^{\circ}\text{C}\pm 2\text{ }^{\circ}\text{C}$ and the relative humidity at $50\%\pm 10\%$ for not less than 4 hours, and the test shall be conducted in this environment.

8.1 Method A (Projector method)

8.1.1 Cut a test block of approximately 50 mmx50 mm with original thickness from the part to be tested, conforming to the description in GB/T 6342.

8.1.2 Cut a test piece with a thickness of no more than 1 mm from the test block. To ensure that the cell image is not obscured by the overlapping of the cell walls, the thickness of the specimen shall be as small as possible.