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GB/T 8813-2020 / ISO 844:2014

Replacing GB/T 8813-2008

Rigid cellular plastics - Determination of compression properties

硬质泡沫塑料 压缩性能的测定

(ISO 844:2014, IDT)

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 8813-2008, “Rigid cellular plastics - Determination of compression properties”. Compared with GB/T 8813-2008, the major changes of this Standard are as follows:

-- Modify the scope (see Chapter 1, Chapter 1 of version 2008);

-- Modify symbols and abbreviations (see Chapter 4; Chapter 4 of version 2008);

-- Modify the displacement measurement (see 6.2.1; 6.2.1 of version 2008);

-- Modify the state adjustment (see 7.4; 7.4 of version 2008);

-- Modify the test procedures (see Chapter 8; Chapter 8 of version 2008);

-- Modify the overview (see 9.1; 9.1 of version 2008);

-- Modify the units of compressive strength and compressive stress at 10% relative deformation (see 9.2.1, 9.3; 9.2.1, 9.3 of version 2008);

-- Modify the compressive modulus of elasticity (see 9.4; 9.4 of version 2008);

-- Modify the test report (see Chapter 11, Chapter 11 of version 2008);

This Standard uses the translation method that is equivalent to ISO 844:2014, “Rigid cellular plastics - Determination of compression properties”.

The documents of our country that have a consistent correspondence with the international documents that are referenced in this Standard are as follows:

-- GB/T 6342-1996, Cellular plastics and rubbers - Determination of linear dimensions (ISO 1923:1981, IDT).

This Standard was proposed by China National Light Industry Council.

This Standard shall be under the jurisdiction of National Technical Committee 48 on Plastic Products of Standardization Administration of China (SAC/TC 48).

The drafting organizations of this Standard: Light Industry Plastics Processing Application Research Institute, Hebei Wuzhou Kaiyuan Environmental Protection New Material Co., Ltd., Wuhan Industrial Control Inspection and Testing Co., Ltd., Shanghai Pugong Testing Technology Co., Ltd., China National Centre for Quality Supervision & Test of Plastic Products (Beijing).

Rigid cellular plastics - Determination of compression properties

1 Scope

This Standard specifies methods for determining the following parameters:

a) Compressive strength and relative deformation; or

b) Compressive stress at 10% relative deformation; and

c) Compression modulus of rigid cellular plastics, if needed.

There are two methods:

-- Method A uses beam displacement to determine compression properties. When it is necessary to determine the compressive stress at 10% relative deformation, use Method A.

-- Method B uses a strain measurement device (contact extensometer) or a similar device that is fixed on the sample to directly measure the deformation of the sample. When it is necessary to determine the compression modulus, use Method B.

Note: Both method A and method B can determine the compressive strength (at maximum load).

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

ISO 1923, Cellular plastics and rubbers - Determination of linear dimensions

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1 Relative deformation

ε

σ_m: compressive strength, MPa.

σ_{10}: compressive stress at 10% relative deformation, MPa.

x_e: displacement corresponding to the compressive force F_e within the proportional limit, mm.

x_m: displacement corresponding to the maximum compressive force F_m when the relative deformation $\varepsilon<10\%$, mm.

x_{10}: displacement when the relative deformation is 10%, mm.

5 Principle

Apply a vertical compressive force to the surface of the sample, so as to calculate the maximum stress that the sample bears. If the relative deformation corresponding to the maximum stress is less than 10%, call it “compressive strength”. If the relative deformation corresponding to the maximum stress reaches or exceeds 10%, take the compressive stress at 10% relative deformation as the test result, which is called “compressive stress at 10% relative deformation”.

6 Equipment

6.1 Compression testing machine

The range of force and displacement of the used compression testing machine shall meet the requirements of this Standard. Two square or round parallel plates with polished surface and no deformation are required. The side length (or diameter) of the plate is at least 100 mm and larger than the pressure surface of the sample; one of them is fixed and the other can be moved at a constant rate according to the conditions that are specified in Chapter 8. The two plates shall always be kept level.

6.2 Displacement and force measurement device

6.2.1 Measurement of displacement

Method A -- The compression testing machine shall be equipped with a device that can continuously measure the displacement x of the moving plate; the accuracy is ±5% or ±0.1 mm; if the latter is more accurate, select the latter (see the second paragraph of 6.2.2).

It is not allowed to stack several samples for testing.

The results that are measured on samples of different geometries and thicknesses are not comparable.

7.2 Preparation

When preparing the sample, its pressure surface shall be perpendicular to the direction in which the product is stressed. To understand the complete characteristics of anisotropic materials, or to know the main direction of anisotropic materials, prepare multiple sets of samples.

In general, the characteristics of anisotropic body are represented by a plane and its orthogonal plane; so, two sets of samples are considered.

The preparation of sample shall not change the structure of the foam material. If the product does not retain the molded skin during use, the skin shall be removed.

7.3 Quantity

When taking samples from block materials or thick plates of rigid cellular plastic products, refer to the provisions in the relevant foam plastic product standards for the sampling method and quantity. In the absence of relevant regulations, take at least 5 samples.

7.4 State adjustment

According to one of the following conditions, adjust for at least 6 h:

a) Temperature of (23±2) °C, relative humidity of (50±10) %;

b) Temperature of (23±5) °C, relative humidity of 50^{+20}_{-10} %;

c) Temperature of (27±5) °C, relative humidity of 65^{+20}_{-10} %.

8 Test procedure

The test condition shall be the same as the condition of the sample state adjustment.

According to the provisions of ISO 1923, measure the three-dimensional size of each sample. Place the sample in the center between the two parallel plates of the compression testing machine; compress the sample at a rate of 10% of the initial thickness of the sample per minute as much as possible, until the compressive strength σ_m and/or the compressive stress at 10% relative deformation σ_{10} are measured.

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