

ICS 83.080.01

CCS G 31



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

GB/T 1041-2008

Replacing GB/T 1041-1992; GB/T 14694-1993

**Plastics -- Determination of compressive properties
(English Translation)**

Issued on: September 4, 2008

Implemented on: April 1, 2009

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China, Standardization
Administration of the People's Republic of China**

Table of Contents

1	Scope
2	Normative references
4	Principles
5	Equipment
5.1	Testing machine
5.2	Device for measuring sample size
6	Samples
6.1	Shape and size
6.2	Preparation
6.3	Sample
6.4	Anisotropic materials
7	Number of samples
8	Condition adjustment of the sample
9	Test steps
9.1	Test environment
9.2	Measurement of sample size
9.3	Sample loading
9.4	Preload
9.5	Test speed
9.6	Data recording
10	Calculation and presentation of results
10.1	Stress
10.3	Compression modulus
10.4	Statistical parameters
10.5	Significant figures
11	Precision
12	Test report

1 Scope

This standard specifies the method for determining the compressive properties of plastics under standard conditions. A standard specimen is specified, but its length can be adjusted

in case Prevent its compression warpage from affecting the test results, as well as the range of test speed.

This standard is used to study the compressive behavior of samples and to determine the compressive stress-strain and compressive strength, compressive modulus and relationship to other properties.

This standard applies to the following materials.

- Rigid and semi-rigid thermoplastic molding and extrusion materials, including reinforced composites filled with short fibers, strips, flakes or granules and unfilled composite or semi-rigid thermoplastic sheets;
- Rigid or semi-rigid thermosetting molding materials, including filled or reinforced composite materials, rigid or semi-rigid thermosetting sheets;
- Thermotropic liquid crystal polymer.

According to ISO 10350-1:1998 and GB/T 19467.2-2004, this standard is applicable to fibers whose fiber length before processing is $\leq 7.5\text{mm}$.

Dimensional reinforced composite materials.

This standard does not generally apply to textile fiber reinforced composite plastics and laminates, rigid foams and materials containing foam or foam Rubber sandwich construction material.

Specimens used in this standard may be molded of selected dimensions or may be machined from the middle of a standard multipurpose specimen.

(GB/T 11997-2008) or machined from finished or semi-finished products such as molded, extruded or cast into sheets.

This standard specifies preferred specimen dimensions. The results of tests carried out on different specimens or on specimens prepared under different conditions are incomparable. Other factors, such as test speed and state conditioning, can also affect test results. therefore. When needed for test data when making comparisons, these factors should be strictly controlled and recorded.

2 Normative references

The clauses in the following documents become the clauses of this standard through the reference of this standard. For dated references, all subsequent Amendments (not including errata content) or revised editions do not apply to this standard, however, encourage the parties to the agreement based on this standard to study Whether the latest versions of these files are available. For undated references, the latest version applies to this standard.

4 Principles

Compress the specimen at a constant velocity along the major axis of the specimen until failure occurs or a certain load or reduction in specimen length is reached value reaches the predetermined value. Measure the load on the sample during this process.

5.1.1 Overview

The testing machine shall comply with the provisions of GB/T 17200-1997 and shall also meet the provisions of 5.1.2 to 5.1.5.

5.1.2 Test speed

The testing machine should be able to maintain the test speed specified in Table 1. If other speeds are used, when the speed is lower than 20mm/min, the speed of the testing machine the speed tolerance should be within $\pm 20\%$; and when the speed is greater than 20mm/min, the tolerance should be within $\pm 10\%$.

5.1.3 Compression appliances

The two hardened steel compression plates that apply deformation load to the sample shall be able to load the sample in the axial direction, and the deviation from the axial direction shall be within 1.1000.

At the same time, the load is transmitted through the polished platen surface. The flatness of these plates is within 0.025mm. The two plates are parallel to each other and perpendicular to the load shaft.

NOTE: Self-aligning equipment may be used if required.

5.1.4 Load indicator

The load indicator shall be provided with a device capable of indicating the total compressive force to which the specimen is subjected, which is substantially inertialess at the specified test speed.

hysteresis, the accuracy of the indicated total value shall be at least within $\pm 1\%$ of the indicated value.

NOTE: The use of a commercially available circular strain gauge system can compensate for lateral forces that may arise due to misalignment (see 9.3).

5.1.5 Strain gauges

Strain gauges are used to measure the change in length of the corresponding portion of the specimen. If the compressive strain ϵ is determined (priority research), then this

length is the standard in addition, for the nominal compressive strain ϵ_{nc} , this length is the distance between the two contact surfaces of the compression device. It would be nice to automatically log this distance.

The instrument shall be substantially free of inertial hysteresis at the specified test speed. For the measurement of modulus, type A specimens shall be used to the required accuracy.

Use at least $\pm 1\%$ of the strain span. As a measure of compressive modulus, it is equivalent to $\pm 1 \mu\text{m}$ of 50 mm gauge length and 0.2% strain spacing.

When the strain gauge is added to the sample, avoid any slight deformation or damage to the sample, and ensure that there is no gap between the strain gauge and the sample.

How to slide.

The specimens may also be fitted with longitudinal strain gauges whose accuracy shall be at least 1% of the strain interval used. For modulus measurements this is equivalent to strain the precision is 2.0×10^{-5} . The strain gauges used, the method of specimen preparation and the adhesive used shall be selected so as not to affect the test results.

Note: Slight misalignment and inherent warping of the specimen may cause differences in strain between opposite sides of the specimen, resulting in errors at low strains. In this kind of in this case, the average strain on two opposite surfaces of the specimen can be measured. However, when using the data collected separately by strain gauges on each side of the sample, warping of the sample will be found.

warping and bending much faster than the average strain of two opposing surfaces.

5.2.1 Hard materials

Use a micrometer or equivalent instrument to measure the thickness, width and length of the sample to the nearest 0.01mm.

The size and shape of the sample measuring platform should be suitable, and the force applied should not change the size of the sample.

5.2.2 Semi-rigid materials

Measure the thickness of the sample with a flat circular presser foot micrometer or an equivalent instrument capable of applying a pressure of $(20 \pm 3) \text{ kPa}$ to the sample, accurate to 0.01mm.

6.1.1 Overview

Specimens shall be prismatic, cylindrical or tubular. The dimensions of the specimen shall satisfy the following inequality (1) (see also Appendix B).