

JIS

JAPANESE INDUSTRIAL STANDARD

Testing Methods for Specific Heat Capacity of Plastics

JIS K 7123—1987

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by

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

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Testing Methods for Specific Heat
Capacity of Plastics

K 7123-1987

1. Scope

This Japanese Industrial Standard specifies the testing methods for the specific heat capacity of plastics.

2. Definition

The meanings of the main terms used in this Standard shall be as specified in JIS K 6900 and JIS K 7121 except as specified in the following:

isothermal base line A DSC curve obtained after the temperature is set at a definite value and a stationary condition is reached.

3. Conditioning of Test Piece

The test piece shall be conditioned by either one of the following two methods:

- (1) When Measuring Specific Heat Capacity after Conditioning under Standard Atmospheric Conditions The test piece shall, as a rule, be conditioned for 24 hours or longer under the standard temperature condition grade 2 and the standard humidity condition grade 2 (temperature, $23 \pm 2^\circ\text{C}$; relative humidity, $50 \pm 5\%$) of JIS K 7100 before testing. However, conditioning may be performed according to the method agreed upon between the parties concerned.
- (2) When Measuring Specific Heat Capacity after Definite Heat Treatment After the conditioning of (1), the test piece shall be placed in the receptacle of DSC apparatus, and melted by heating to a temperature at least about 30°C higher than that at the end of glass transition in the case of a non-crystalline product, and to a temperature at least about 30°C higher than that at the end of melting peak in the case of a crystalline product, and after being maintained at those respective temperatures for 10 minutes, cooled to a temperature about 20°C lower than the lower limit temperature in the specific heat capacity measuring range at a cooling rate of 5°C or 10°C per minute.

Applicable Standards:

JIS K 6900-Glossary of Terms Used in Plastic Industry

JIS K 7100-Standard Atmospheres for Conditioning and Testing of Plastics

JIS K 7121-Testing Methods for Transition Temperatures of Plastics

JIS Z 8401-Rules for Rounding off of Numerical Values



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4. Testing Methods

The test shall be performed by either one of the following methods:

- (1) Power compensation differential scanning calorimetry (power compensation DSC)
- (2) Heat-flux differential scanning calorimetry (heat-flux DSC)

5. Apparatus and Appliances

5.1 Apparatus

5.1.1 DSC Apparatus The DSC apparatus shall have two receptacle holders of equal heat capacity and have a construction capable of heating and cooling under the same heat exchange conditions. The power compensation DSC apparatus used shall be constructed to allow the measurement of the difference in heat energy input per unit time applied to the reference material and test piece so as to equalize the temperatures of the test specimen and reference material. The heat-flux DSC apparatus used shall be so constructed that the difference in temperature between the test specimen and reference material is proportional to the difference in heat energy input per unit time.

- (1) Heating Rate The heating device shall be able to raise the temperature at a rate of 10°C per minute with an accuracy of within $\pm 0.5^\circ\text{C}$ per minute.
- (2) Cooling Rate The cooling device shall be able to lower the temperature at a rate of 5°C or 10°C per minute.
- (3) Gas Inflow Device The gas inflow device shall have a construction capable of making the gas flow around the test piece.
- (4) Receptacle The receptacles used shall be made of a material resistant to corrosion by the test piece and having a high thermal conductivity.
- (5) Recording The recording device shall be able to record the DSC curve automatically.
- (6) Noise Level The noise level shall be within 1/10 of the difference in height in the vertical axial direction between the DSC curve obtained when measuring with the standard substance for specific heat capacity and the isothermal base line (/ in Figure).

5.2 Appliances

5.2.1 Gas Flowmeter The gas flowmeter shall be able to measure the range of 10 to 50 ml per minute.

5.2.2 Chemical Balance The chemical balance shall have a reciprocal sensibility of 0.01 mg or higher.