

JIS

JAPANESE INDUSTRIAL STANDARD

**Measuring Methods of
Low Pressures by
Thermal Conductivity Gauge**

JIS Z 8753—1989

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Measuring Methods of Low Pressures by Thermal Conductivity Gauge

Z 8753-1989

1. Scope

This Japanese Industrial Standard specifies the general methods for measurement of low pressures using vacuum gauge utilizing the thermal conduction through gas molecules, hereinafter referred to as the "gauges".

Remark: The method using gauges utilizing the heat transfer by convection is not covered by this Standard.

2. Definition

The meanings of the main terms used in this Standard shall be as specified below except those specified in JIS Z 8126, JIS Z 8127, and JIS Z 8128.

- (1) pressure-sensitive element An element contained in the gauge head, such as a filament heated by electric current, or the like.
- (2) envelope element A part of the gauge head, consisting of a receptacle containing a pressure-sensitive element.
- (3) vacuum system A vacuum device to be the object of measurement of pressure.
- (4) controlled measuring unit A measuring instrument having both a power source which operates the gauge head and the function of measuring resistance and the like and indicating the pressure.

3. Principle of Measurement

Pressures are measured electrically by utilizing the fact that the heat loss produced by heat conduction through the surrounding gas molecules from the pressure-sensitive element heated by the electric current depends on the pressure.

Reference: The heat loss from the pressure-sensitive element depends not only on the pressure of the surrounding gas but also on the kind of gas, temperature difference between the pressure-sensitive element and the envelope and pressure-sensitive element supporter, the coefficient (accommodation factor) relating to the thermal energy exchange between the surface of the pressure-sensitive element and the inner surface of the envelope and those molecules colliding with such surfaces, and the emissivity of the surface of the pressure-sensitive element.

Applicable Standards:

JIS Z 8126-Vacuum Technology – Vocabulary (General Terms)

JIS Z 8127-Vacuum Technology – Vocabulary (Vacuum Pumps and Related Terms)

JIS Z 8128-Vacuum Technology – Vocabulary (Vacuum Gauges and Related Terms)

JIS Z 8750-Methods of Calibration for Vacuum Gauges