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Test methods for physical properties of graphite materials

1 Scope This Japanese Industrial Standard specifies test methods for physical properties of graphite materials (hereafter referred to as "materials").

Remarks: The normative references to this Standard are as follows:

JIS B 7502 *Micrometer callipers*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7512 *Steel tape measures*

JIS B 7516 *Metal rules*

JIS B 7721 *Tensile testing machines*

JIS B 7733 *Compression testing machines*

JIS K 8810 *1-Butanol*

JIS Z 8401 *Rules for rounding off of numerical values*

JIS Z 8801 *Test sieves*

2 Test items Items for measuring physical properties specified in this Standard are as follows:

- (1) True specific gravity
- (2) Bulk specific gravity
- (3) Bending strength
- (4) Compressive strength
- (5) Tensile strength
- (6) Young's modulus
- (7) Resistivity

3 Common apparatus

3.1 Balance The reciprocal sensibility of a balance to be used shall be at most 1/2 000 of weighing capacity for a weighing capacity of 1 kg or over, and at most 1/20 000 of weighing capacity for a weighing capacity less than 1 kg.

3.2 Length meter For the measurement of a size in the range 0 mm to 50 mm, a micrometer with 0.01 mm minimum scale specified in **JIS B 7502** shall be, as a rule, used. For the measurement of a size in the range 50 mm to 1 000 mm, vernier calliper with 0.05 mm minimum scale specified in **JIS B 7507** shall be, as a rule, used. For the measurement of a size in the range 1 000 mm to 3 000 mm, a steel tape measure with 1 mm minimum scale specified in **JIS B 7512** or a metal rule with 1 mm minimum scale specified in **JIS B 7516** shall be used.

3.3 Thermometer The mercury in glass thermometer having a range of 0 °C to 150 °C shall be used. However, for the thermometer used for measurement of true specific gravity, that of 1/100 °C in precision shall be used.

3.4 Dryer An electric thermostat with automatic temperature regulator capable of keeping the temperature at 105 °C to 110 °C shall be used.

4 Rounding off of numerical values of test results Rounding off of the numerical values of test results shall be as specified in **JIS Z 8401**.

5 Sample The sampling method, shapes and sizes of test pieces, and preparation of sample shall be as given in Table 1.

Table 1 Sampling method, shapes and sizes of test pieces, and preparation of sample

Test item	Position, direction, and quantity of sampling	Shape and size
Bending strength	A test piece shall be taken from a part of specimen material by aligning the longitudinal direction of the test piece to the longitudinal direction of specimen material and avoiding the peripheral part. The number of test pieces shall be two pieces per each test item.	A round bar of 20 mm diameter and 100 mm length or a square bar of 20 mm width, 20 mm thickness, and 100 mm length.
Young's modulus		
Resistivity		
Tensile strength		As given in Fig. 1.
Compressive strength		A column of 30 mm diameter and 30 mm length
True specific gravity	As a rule, all amount of test pieces subjected to the bending strength test shall be crushed, sufficiently mixed, reduced to about 30 g and ground in an agate mortar until all amount passes through standard wire sieve of 150 µm specified in JIS Z 8801 , and then used for the sample of true specific gravity test.	
Bulk specific gravity	The test pieces not yet subjected to the bending strength test shall be used.	

Remarks 1 Measurements of the bulk specific gravity, Young's modulus, and resistivity of artificial graphite round electrode shall, as a rule, be carried out on the electrode main body.

2 When the sample of the dimensions given in the above table can not be taken according to the size, grain size, etc. of raw material, the shape and dimensions of a test piece can be varied. In this case, the shape and dimensions of the test piece shall be clearly stated on the test report.