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JAPANESE INDUSTRIAL STANDARD

Granules and agglomerates— Test methods for strength

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Granules and agglomerates — Test methods for strength

Z 8841-1993

1. Scope This Japanese Industrial Standard specifies the test methods for crushing strength, tumbler strength and shatter strength in the strength test methods of granules and agglomerates.

Remarks: The following standards are cited in this Standard:

JIS R 3505	Volumetric glassware
JIS Z 8401	Rules for rounding off of numerical values
JIS Z 8801	Test sieves
JIS Z 8815	Test sieving

2. Definitions For the main terms used in this Standard, the definitions given in JIS Z 8815 apply, and the rest of the terms shall be as follows:

(1) granules and agglomerates The powdered formations having a relatively uniform shape produced by the granule operation. Generally they are called agglomerates, pellets, brickets and tablets.

(2) crushing strength Strength represents the resistance for breakdown by compression of granules and agglomerates.

(3) tumbler strength Strength represents the resistance for breakdown mainly by the scrubbing of granules and agglomerates.

(4) shatter strength Strength represents the resistance for breakdown by the dropping shock of granules and agglomerates.

3. Test methods for strength of granules and agglomerates

3.1 Test methods for crushing strength

3.1.1 Test machine The test machine for crushing strength of granules and agglomerates, shall be composed of loading part and indicating part, and shall be as follows. An example of it is shown in Fig. 1, and an example of the composition of the loading part is shown in Fig. 2.

(1) The compression planes in the loading part shall be parallel and flat, the surfaces of which shall be hard enough and free from deformations, and be smooth, and the moving compression plate shall be movable at a constant speed.

(2) Indication record in the indicating part shall be able to record the relation between the load and displacement with passing time. If the relation between the load and time, or between the load and displacement is known, and in the case of sample in which the complete breakdown load(1) is clearly measurable, only the indication of load may be used.

Note (1) The maximum value of the load, when the relation between the load and time or between the load and displacement is indicated by a recorder.

(3) A scale division of the indication part shall be $\frac{1}{100}$ or less of the maximum scale value.

Fig. 1. An example of composition of the test machine for crushing strength

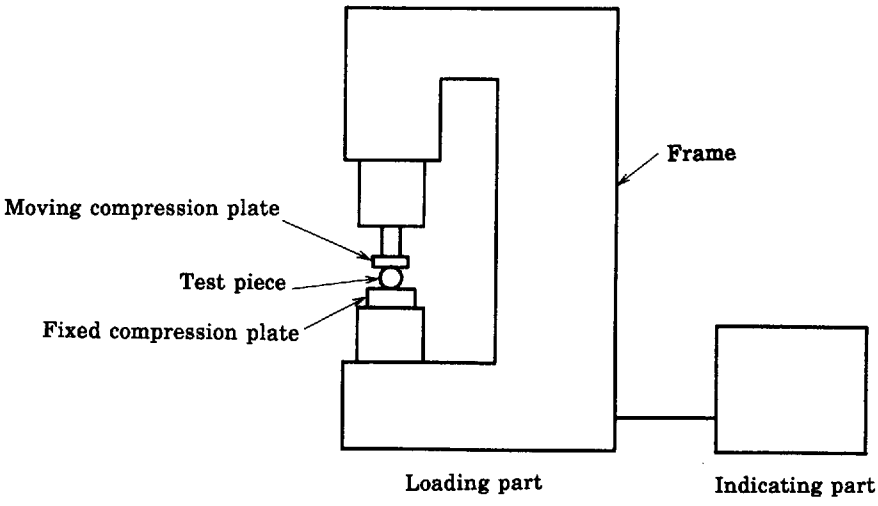
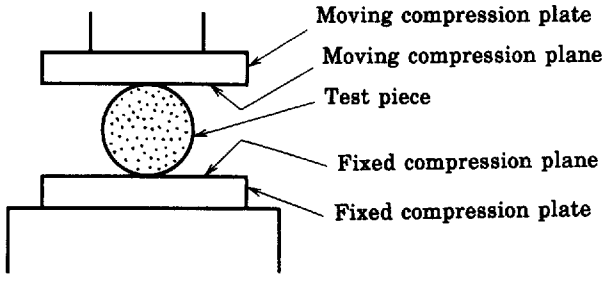


Fig. 2. An example of the composition of the loading part



3.1.2 Sampling method of samples Samples shall be sampled without injuring the granules and agglomerates which are to be measured. When the samples are in large number, they shall be collected to be a required number, to avoid the bias by a proper sampling method.

3.1.3 Test method Test method shall be as follows:

(1) A test piece shall be placed on the center of the fixed compression plane of the test machine.

(2) At the position, which both the fixed compression plane and the moving compression plane make contact to the test piece, the distance between the both compression planes shall be measured and recorded, and it is regarded as the size of the test piece. However, in the case where the size of the test piece in the compressing direction is measured previously, the measurement of the distance may be omitted.

(3) Moving compression plate shall be moved at a constant speed, and give a load on the test piece.

Informative reference: Compressing speed for the general granules and agglomerates of 2 mm to 20 mm in size, shall be about 0.15 mm/s to 0.30 mm/s.

(4) Record the maximum indicated value of the load until the test piece is completely crushed, taking it as the crushing strength of the test piece. However, in the case the maximum indicated value until the test piece is crushed cannot be recorded, when the crushing is clearly recognized in the compressing process, taking the load at that crushing as the crushing strength, and that displacement shall be recorded.

3.1.4 Recording items of the test results The recording items of the test results shall be as follows:

(1) Name of sample

(2) Method of granulation

(3) Sampling method of samples (2)

(4) Conditions of the test machine (compressing speed, maximum scale value of the load indication)

(5) Shape and compressing direction of the test piece (3)

(6) Size of the test piece

(7) Crushing strength

(8) Displacement until crushing (4)

Notes (2) Enter concretely the size of the test piece, the point of reducing and the like.

(3) Express by characters or figures.

(4) Enter only, in the relation of compression load and displacement, when the maximum value of the load until the crushing cannot be recognized.

An example of the recording table of the test results is shown in Table 1.