JIS

JAPANESE INDUSTRIAL STANDARD

Methods for Testing of Coke

JIS K 2151 —1977

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JAPANESE INDUSTRIAL STANDARD   J I S

Methods for Testing of Coke   K 2151-1977
(Reaffirmed: 1980)

1. General Rules

1.1 Scope   This Japanese Industrial Standard specifies testing methods for particle size, bulk specific gravity, specific gravity and porosity, drop shatter strength, rotating strength, reactivity, and fusibility of ash of coke.

1.2 Balance   The reciprocal sensibility shall have a precision of one thousandth of the weighing capacity unless otherwise specified in this standard. The balance, as close as possible to the weighing capacity of the balance corresponding to the weight of sample, should be used.

1.3 Rounding Off of the Numerical Values   For the calculation and marking of measured values of each test, the numerical values shall be rounded off according to JIS Z 8401.

2. Testing Method of Particle Size

2.1 Summary   Samples shall be sieved with the prescribed sieve and the masses of the retaining amounts on each sieve and the passing amount through the smallest apertures shall be weighed and the particle size of the sample expressed by mass percentage to the sample.

2.2 Sample

Applicable Standards:

JIS C 1601–Indicating Thermoelectric Thermometers

JIS C 1602–Thermocouples

JIS M 8100–Common Rules for Methods of Sampling Bulk Materials of Mining Products

JIS M 8811–Methods for Sampling and Determination of Total Moisture and Adherent Moisture of Coal and Coke

JIS M 8812–Methods for Proximate Analysis of Coal and Coke

JIS R 1307–Porcelain Combution Tubes for Chemical Analysis

JIS Z 8401–Rules for Rounding Off of Numerical Values

JIS Z 8704–Electrical Methods of Temperature Measurement

JIS Z 8801–Sieves for Testing Purposes

2.2.1 <u>Sampling</u>   Samples shall be taken according to 3. in JIS M 8811.

However, when there is no information about the sampling, and when specially, the accuracy is seriously concerned, the sampling number of increments n, in principle, shall be obtained depending on Fig. 1, from the relation between the required accuracy and the number of sampling increments (n), according to the size-fraction content.   When one lot is 1000 t and over, obtain n' proportional to square root of lot size based on 1000 t as standard.

$$n' = \text{(number of sampling increments obtained from Fig. 1 } (n) \text{)}$$
$$x \sqrt{\frac{\text{size of lot (t)}}{1000 \text{ (t)}}}$$

In this case, the particle size to be guaranteed, and its content as well as the percentage of accuracy (β) to be required in 95 % probability shall be subjected to the decision between the parties concerned.

Fig. 1.   Chart for Determining the Number of Sampling Increments (Probability 95 %)

Number of sampling increments (n)
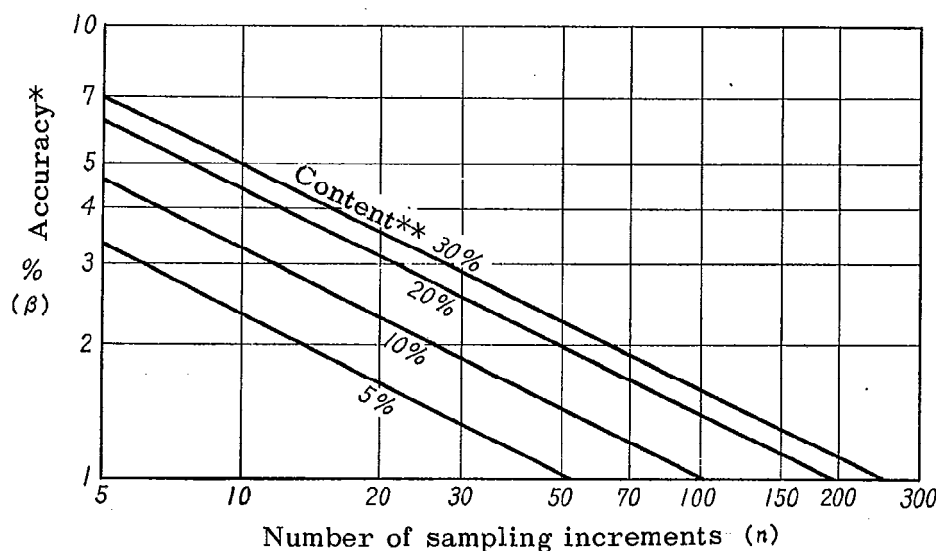
Notes *   Take the required accuracy % on the ordinate, obtain the cross point of the horizontal line passing the point and the straight line showing content, and obtain the number of sampling increments from the scale of abscissa.

**   The content in the Chart expresses the content of particle size over a certain sieve aperture or under a sieve aperture.

Remarks 1.   The dispersion of particle size in one lot is remarkably large and, varies significantly according to the lot conditions, therefore number of n shown in Fig. 1, shows merely the principle.   In practice, because the accuracy may vary according to the methods of manufacturing the lot, transportation and storing, it is recommendable to determine n by check experiment.

Remarks 2. The content of 50 mm and over of particle size is 10 %, and
the content of 10 mm and under of particle size is 10%, namely,
when particle size of 10 to 50 mm occupies by 80 %, it is
recommended to use 10 % content line in Figure.

3. For the estimation of particle size content of 10 mm and under
at the accuracy (β) 2 % (probability 95 %) for a lot having
about 10 % of 10 mm and under of coke, it is sufficient to take
about 26 sample increments.

4. For the estimation of the content of the particle size at the
accuracy (β) 1 % (probability 95 %) for a lot having about 10 %
of 75 mm and over of particle size of coke, it is sufficient
to take about 100 sample increments.

2.2.2 <u>Preparation of Sample</u>   In principle, each small lot, or each large
lot without reduction, as it is, for every increment shall be subjected to the
sample for measuring particle size as a whole.   For sampling, when it is
impossible to take nearly constant size of increments (coefficient of variation CV

$$= \frac{\text{standard deviation of size of increments}}{\text{average size of increment}} \times 100, \text{ 20 \% and under}),$$

measurements shall be carried out for each increment.   However, when a
sample having the particle size passing through all 20 mm and under and the
amount of the sample is larger than (mass of increment specified in 3.4 of
JIS M 8811) x (number of increments determined by 2.2.1), it may be reduced
to the amount without crushing according to 4.4 (Method for Preparation of Samples)
in JIS M 8811, as appropriate.

2.2.3 <u>Drying of Sample</u>   The samples obtained by 2.2.1 and 2.2.2 shall
be dried to the extent not to impair sieving.

2.3 <u>Sieve</u>   Among the following sieves, necessary sieves shall be
determined between the parties concerned and used.

2.3.1 <u>Aperture of Sieve</u>   150 mm, 125 mm, 100 mm, 80 mm, 75 mm,
60 mm, 50 mm, 38 mm, 35 mm, 30 mm, 25 mm, 20 mm, 15 mm, 10 mm, 6 mm,
5 mm, 2830 μm, 2000 μm, 1000 μm

2.3.2 <u>Shape of Aperture of Sieve</u>   The shape of apertures of sieves
shall be as follows:

(1) The plate sieve shall be machine-stamped steel plate with square
apertures, the tolerances and the thickness of the plate shall be in
accordance with Attached Table 3 of 4.2 in JIS Z 8801, and the pitch
of the apertures shall comply with Table 1.

Table 1. Pitch of Apertures of Sieves

Aperture mm	Thickness mm	Pitch of aperture mm
125 min.	3.2	10
100 to 50	2.3	7
38 to 5	1.5	5

The layout of apertures of sieves of less than 50 mm to 5 mm shall be checker type, and that of 50 mm and over, stagger type (refer to Attached Fig. 1).

The layout of apertures 38 mm of sieves used for 6. (testing method for rotary strength) shall be stagger type.

Remark: The material of plate sieves is preferable to use stainless steel.

(2) For net sieves, Attached Table 1 in JIS Z 8801 shall be applied, as appropriate.

Remark: In the case of tests of particle size less than 1000 μm, it shall be carried out by means of net sieves of Attached Table 1 of 4.1 in JIS Z 8801.

2.4 Procedure

2.4.1 Procedure by Hand   The procedures shall be carried out as follows:

(1) Weigh the mass of the sample, and charge it on the prescribed sieve with the maximum apertures.

In this case, the charging quantity of one time shall be less than such quantity that all the grains contact directly to the aperture of each sieve after the operation of sieving is finished.

(2) Separation by sieving shall be carried out by shaking horizontally the sieve by hand.

(a) In the Case of the Aperture of the Sieve 75 mm and Over   Allow to pass through in either direction, preventing from missing the passing through.

(b) In the Case of the Aperture of the Sieve Less than 75 mm and 20 mm and Over   Shake horizontally 10 times covering a distance about 20 cm with a necessary speed to permit for grains on the sieve a rotary motion.