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GB/T 1997-2008

Replacing GB/T 1997-1989

Coke - Sampling and preparation of samples

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Foreword

This Standard replaces GB/T 1997-1989 *Coke - Sampling and Preparation of Samples*.

Compared with GB/T 1997-1989, this Standard has the following main changes:

-- Revise the format of this Standard;

-- Revise the terms and definitions of this Standard and add English names;

-- Properly revise the safekeeping and reserve time of samples.

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Steel Standardization Technical Committee.

Drafting organizations of this Standard: China Metallurgical Information and Standardization Institute, Shougang Company Limited AND Sinosteel Anshan Research Institute of Thermo-energy Co., Ltd.

Main drafters of this Standard: Sun Wei, Xi Wanze, Zhu Mingsan and Zhang Jinying.

This Standard replaces the following previous standards:

- GB 1997-1980, GB/T 1997-1989.

Coke - Sampling and preparation of samples

1 Scope

This Standard specifies the terms and definitions in respect of sampling and preparation of coke samples, the sampling place, house, equipment-tools, as well as sampling and preparation of samples for industrial analysis and physical properties test.

This Standard is applicable to the sampling and preparation of coke samples for industrial analysis and physical properties test.

2 Normative references

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 2007.5 General rules for the sampling and sample preparation of minerals in bulk - Experimental method for checking the bias of sampling

GB/T 9977 The terms of coking products

3 Terms and definitions

Terms and definitions determined in GB/T 9977 as well as the following ones apply to this Standard.

3.1 Lot and batch

Coke of same specification at same delivery shall be deemed as one lot, and the mass of one lot of coke is called batch.

3.2 Basic lot

It means the specified minimum batch.

3.3 Share sample

It means the coke sample obtained by sampling tool when it works one time at one part of one lot of coke (continuous times available for manual sampling).

3.4 Vice sample

It is composed of partial share samples taken from one lot of coke.

3.5 Great sample

It is composed of all share samples or all vice samples taken from one lot of coke.

3.6 Sample again use

Use all samples to determine an item, then use it to determine other items after the preparation of partial or all these samples.

3.7 Spare sample

Sample that is prepared for or unprepared but reserved for determining a certain test item.

3.8 Maximum size

The minimum size of mesh through which over 95% of coke can pass.

4 General

4.1 Moisture sample

4.1.1 After moisture sampling, it shall be immediately put into a corrosion-resistant sample storage barrel with a sealed cover or other watertight sealed container. Tightly cap the barrel or container after each share sample is put in place.

4.1.2 The sample storage barrel with moisture samples inside shall be kept away from heat sources and direct exposure in the sun. After sampling, preparation of samples shall be conducted in time. If determination results are affected by excessively large batch of coke or long interval between two coke transports, the share samples shall be made into vice samples according to the coke transport time. Determine the moisture of the vice samples. Take weighted average of vice sample moisture as moisture determination result of this lot of coke. The moisture can also be determined by sample division after mixing the vice samples according to the proportion of the share samples.

Table 3 Minimum mass of share samples of coke

Size range/mm	<25	≥25~<40	≥40~<80	≥80
Min mass of share samples/kg	1	2	5	15

5.5 Sampling in coke flow

5.5.1 During the coke transporting by belt conveyer, the interval of share sampling shall be determined according to the batch and the quantity of share samples of each batch:

a) While the coke is moving, sampling of share samples shall be conducted according to a certain mass or time interval by using sampling tools.

b) For manual sampling, the convey belt speed shall not exceed 1.5 m/s, and the coke thickness shall not be greater than 0.3 m.

c) When samples are taken from the static belt, each sample shall be taken from the whole section, and the sampling length shall not be less than 2.5 times of the maximum coke size.

The first share sampling shall start at random in the first interval, but it must not begin at the starting point of the first interval. The following share sampling shall be conducted according to the calculated interval. If the quantity of share samples is enough when sampling is conducted according to the fixed interval while the coke transporting does not stop, then share sampling shall be continued according to the original interval until the transporting of the whole lot of coke is finished.

While receiving the samples, the receiving tools shall not be overfilled, so as to prevent large sample overflowing, which may cause test result system error.

5.5.2 Sampling at coke bin or discharge spout

The sampling at coke bin or discharge spout is the same as that in coke flow (5.5.1 a)).

5.5.3 Sampling of loading and unloading truck, ship or over-casting by adopting belt conveyer is the same as that mentioned in 5.5.1. However, if there is no conditions to install a mechanical sampling funnel, sampling shall be conducted as specified in 5.5.4.

5.5.4 Other sampling methods in loading and unloading truck, ship or cover-casting.

5.5.4.1 Large-pile sampling: sampling shall be conducted at different layers of the coke pile during coke loading. The quantity of share samples of the whole

distributed in the pile locations. When the quantity of share samples is less than the number of corresponding pile locations, each pile location shall have at least one share sample.

6 Preparation of coke samples for industrial analysis

6.1 House, equipment-tools

6.1.1 Preparation room

Preparation room shall include preparation of samples (crush, mix, divide, screen, etc.), storage of samples, drying, etc. The room shall be large and bright enough without being affected by rain or wind or foreign dust. It shall have dust-proof equipment. All rooms shall have smooth cement floor. Samples mixing, division and screening shall be conducted on the cement floor paved with a >6 mm steel plate.

6.1.2 Crusher

Crusher applicable to preparation of samples includes jaw crusher, roll-type crusher and other sealed grinders. Theses equipment can be used as long as their material and ratio of crushing meet corresponding requirements, without contamination and easy to clean.

6.1.2.1 Jaw crusher

Jaw crusher usually has three specifications:

a) Opening size is about 200 mm×150 mm, and used for crushing coke size from large and middle to < 60 mm;

b) Opening size is about 150 mm×125 mm, and used for crushing coke size from 60 mm to <13 mm;

c) Opening size is about 100 mm×60 mm, and used for crushing coke size from 13 mm to <6 mm.

6.1.2.2 Roll-type crusher

The roll diameter of roll-type crusher is usually ≥250 mm, and roll width is 75 mm ~ 200 mm. It usually requires 2 roll-type crushers.

a) Used for crushing sample size from 6 mm to <3 mm;

b) Used for crushing sample size from 3 mm to <1 mm.

6.1.2.3 Rock grinder

The acting part of the rock grinder shall be made of high manganese steel, high chrome steel or other wear-resisting alloy steel.

6.1.3 Divider

The inside surface shall be smooth. It shall adopt sealed type to prevent loss of moisture and powder sample. Cone type, rotary type or dichotomous type shall be adopted. Before use, the divider shall be calibrated according to the provisions in GB/T 2007.5. The precision calibration result shall comply with corresponding requirements.

6.1.4 Screen

6.1.4.1 Perforated screen size: 60 mm×60 mm.

6.1.4.2 Woven screen size: 13 mm×13 mm; 6 mm×6 mm; 3 mm×3 mm; 1 mm ×1 mm.

6.1.4.3 Sample screen size: 0.2 mm×0.2 mm.

6.1.5 Sampling shovel, sample tray, brush, weighing apparatus, thermostatic drier, etc.

6.2 Preparation of samples

6.2.1 Preparation of total moisture samples

Crush all coke sample to be less than 60 mm. The sample mass shall not be less than 40 kg after fully mixing and dividing. Crush the sample to be less than 13 mm. Divide the samples into two equal shares. One of them shall be used to divide special samples for determining moisture, and the other shall be used to divide samples for other analyses. Mixing method is described in 6.3.1, and division method is described in 6.3.2.

Divide the samples for determining moisture to 1 kg. Further divide them into two equal shares, and respectively put two shares in two tightly sealed grinding jars. Stick a label on the jars indicating sample number, date, shift number, item name, analysis item, mass, sampling place and operator’s name. One share shall be used for moisture determination, and the other share shall be reserved for future use.

6.2.2 Preparation of analysis samples

Evenly mix the other sample that has been crushed and is less than 13 mm, and the splitting shall not be less than 4 kg. Crush its size to be less than 6 mm, and the evenly mixed splitting shall not be less than 2 kg. Crush its size to be less than 3 mm, and the evenly mixed splitting shall be 1 kg. Completely crush

1 kg of sample to 1 mm. If the sample is damp and affects processing, put this 1 kg of sample into a 150°C ±10°C drying oven to dry for 20 min. Then crush it. Evenly mix and split the 1 mm sample to 40 g, crush it to be less than 0.2 mm, and put it in a grinding jar. Stick a label. Send the jar to the analysis room. Split other samples that are less than 1 mm to about 200 g. Put it in a grinding jar and stick a label, and have it kept in the technical supervision department as reserve sample. The reserve duration is usually a month after the delivery or the reserve duration shall be determined by both parties' negotiation. Refer to Table 4 for sample division standard and Figure 2 for division flow.

6.2.3 Since iron chips that are brought in during the preparation of samples may obviously affect the test results, magnet shall be used. However, magnet is prohibited for commodity coke for export.

Table 4 Sample Division Standard

Screen size for all samples passing through /mm	60	13	6	3	1
Division mass not less than /kg	40	4	2	1	0.04

	M	250	170	105	55	40
	N	75	55	35	20	15
	O	340	300	210	110	80
	P	630	380	346	171	112
	Q	400	300	200	120	80
	R	265	200	135	70	45
	S	200	150	105	50	35

6.3.2 Division of samples

6.3.2.1 Coning and quartering

Uniformly spread the samples that have been mixed by the stacking cone method from the top center of the pile to the surrounding (when sample quantity is large) or flatten them into a flat body. The flat body shall have a proper thickness that is usually about 3 times of the maximum sample size or no more than 50 mm. Mark a “cross” at the center of the flat body, and divide the samples into four equal sectors. Discard two opposite sectors and reserve the other two sectors. If the mass of two reserved sectors exceeds the splitting standard, they shall be further divided into the mass that is not less than the specified.

6.3.2.2 Grid division

Mark several lateral and longitudinal lines of same distance on the flat sample that has been mixed by tiling method, so as to form the sample into several squares or rectangles of same size. Use a sampling shovel to take a portion along the bottom from each grid as the division sample. To prevent large size sample falling, a damper shall be inserted to the bottom of the sample when shoveling samples. Great division samples shall not be less than 20 grids; vice division samples shall not be less than 12 grids; share division samples shall not be less than 4 grids.

6.3.2.3 Riffle division

The groove width of the riffle shall match the maximum sample size. Continuously feed the samples into the riffle. The feeding container (dustpan) width shall match the riffle length to ensure samples uniformly distributed in all grooves. Control the feeding speed, so as to let the samples fall freely without blocking grooves. Take either side of sample as the division sample. If division is conducted continuously, samples shall be alternately taken from the two sides of the riffle. Specification and size of the riffle are shown in Figure 3 AND Table 5.

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