

ICS 73.040
CCS D 21



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 7560-2001

**Determination of mineral matter in coal
(English Translation)**

Issued on: November 12, 2001

Implemented on: August 1, 2002

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of PRC**

Table of Contents

Foreword...	3
1 Scope...	4
2 Normative references...	4
3 Definitions...	4
4 Method summary...	4
5 Instruments...	5
6 Reagents...	5
7 Preparation of coal samples for analysis...	5
8 Preliminary tests...	5
9 Determination procedure...	6
10 Result calculation...	7
11 Precision...	9

1 Scope

This standard specifies the instrumentation, reagents, coal sample preparation, measurement procedures, result calculation, precision for the determination of mineral matter in coal.

This standard applies to lignite, bituminous coal, anthracite.

2 Normative references

The provisions of the following standards are incorporated herein by reference. At the time of publication, the versions indicated were valid. All standards are subject to revision. Parties using this standard should explore the possibility of using the latest versions of the following standards.

GB/T 212-2001 Proximate analysis of coal (eqv ISO 11722.1999, eqv ISO 1171.1997, eqv ISO 562.1998)

GB/T 215-1996 Determination of forms of sulfur in coal (eqv ISO 157.1975)

GB 474-1996 Preparation of coal sample (eqv ISO 1988.1975)

GB/T 483-1998 General rules for analytical and testing methods of coal

GB/T 3558-1996 Determination of chlorine in coal (eqv ISO 352.1981)

3 Definitions

This standard adopts the following definitions.

3.1 Mineral matter

Mineral matter in coal refers to inorganic matter present in the coal, excluding free water but including combined water.

4 Method summary

Coal samples are treated with hydrochloric acid and hydrofluoric acid; the mass loss of the coal samples after acid treatment is calculated. The ash and iron oxide contents of the acid-treated coal samples are measured. After deducting the iron oxide, the residual ash and the pyrite content in the acid-treated coal samples are calculated. The chlorine content in the acid-treated coal samples is then measured to calculate the amount of hydrochloric acid adsorbed. Based on these results, the mineral content of the coal is calculated.

5.1 Constant-temperature water bath. Capable of maintaining a temperature range of

$(60 \pm 5) ^\circ\text{C}$;

5.2 Air drying oven. Capable of maintaining a temperature range of $105 \sim 150 ^\circ\text{C}$, equipped with a blower;

5.3 Analytical balance. Sensitivity 0.1 mg;

5.4 Plastic beaker with lid. Capacity 200 ~ 250 mL;

5.5 Plastic funnel. Approximately 62 mm in diameter;

5.6 Weighing bottle with lid. Approximately 66 mm in diameter, approximately 33 mm

in height.

6 Reagents

6.1

Hydrochloric acid (GB/T 622). Density 1.18 g/mL;

6.2

Hydrochloric acid. $c(\text{HCl}) = 5 \text{ mol/L}$. Use water to dilute 417 mL of hydrochloric acid (6.1) to 1000 mL.

6.3

Hydrofluoric acid (GB/T 620). Density 1.13 g/mL;

6.4

Ethanol (GB/T 679). 95%;

6.5

Distilled water.

7 Preparation of coal samples for analysis

Prepare the coal sample to a particle size of less than 0.2 mm according to GB 474; allow it to air dry.

8 Preliminary tests

8.1

Determine the moisture and ash content of the coal sample according to GB/T 212.

8.2

Fold a 12.5 cm diameter piece of dense slow-speed qualitative filter paper into a cone shape; place it, along with approximately one-quarter of the filter paper, in a weighing bottle with a lid. Remove the bottle cap; transfer it to a drying oven preheated to approximately 50 °C for 1 hour. Perform a check drying. Each weighing shall last approximately 30 minutes, until the difference between two consecutive weighing is less than 0.001 g or the mass begins to increase. Then, place it in the atmosphere for 1 hour; weigh it (in ma); set aside.

9 Determination procedure

9.1

Accurately weigh 6 g of coal sample (accurate to 0.0002 g); place it in a plastic beaker. Add 1 ~ 2 mL of ethanol (6.4) to moisten the coal sample. Slowly add 40 mL of hydrochloric acid (6.2). Stir thoroughly with a plastic rod, until the coal sample is completely moistened with the hydrochloric acid. Cover the beaker and place the plastic beaker in a constant temperature water bath (5.1) at 55 ~ 60 °C. Stir every 5 ~ 10 minutes. After 45 ~ 50 minutes, remove the beaker; let it stand for a while; pour the clear liquid through the filter paper specified in 8.2 of this standard for filtration.

Note: For coal samples that do not readily separate after standing for a while, centrifugation may be used.

9.2

Use a small amount of hot water (5 ~ 10 mL) to wash the coal sample from the filter paper into the original plastic beaker. Slowly add 40 mL of hydrofluoric acid (6.3).

Repeat the heating treatment as described in Article 9.1 of this standard. Filter the sample using the original filter paper.

9.3

Use a small amount of hot water (5 ~ 10 mL) to wash the coal sample from the filter paper into the original plastic beaker. Slowly add 50 mL of hydrochloric acid (6.1).

Repeat the heating treatment as described in Article 9.1 of this standard. Filter the sample using the original filter paper. Then, use a quarter piece of filter paper as specified in Article 8.2 of this standard to scrub the plastic beaker and plastic rod, to ensure that the entire coal sample is transferred to the filter paper. Wash the filter paper and acid-treated coal sample with hot water, until the volume of the washing solution reaches approximately 400 ~ 500 mL.

9.4 Place the acid-treated coal sample together with the filter paper (including one-

quarter of the filter paper), in the covered weighing bottle specified in 8.2 of this standard. Open the bottle cap and transfer it to a drying oven preheated to $(50 \pm 5) ^\circ\text{C}$.

Dry under forced air for approximately 5 ~ 6 hours. Remove the sample; place it in a desiccator for approximately 25 minutes before weighing. Then perform a check drying cycle, each lasting approximately 1 hour, until the difference between two consecutive weighing is less than 0.005 g or the mass begins to increase.

9.5 Place the dried weighing bottle containing the coal sample and filter paper in the atmosphere for 1 hour, to allow its humidity to reach equilibrium with the atmosphere;

.....