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

GB/T 23249-2009

**Coalbed gas content measurement methods in geological
exploration period**

地勘时期煤层瓦斯含量测定方法

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1 Scope

GB/T 23249-2009 is the Chinese national standard on coalbed gas content measurement methods in geological exploration period, in the field of environment and health protection, safety. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 11 March 2009 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 November 2009. Classification: ICS 13.100, CCS D09. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Standard stipulates the terms and definitions, measurement methods, records and sample delivery, coal sample degassing and gas analysis, determination result calculation and evaluation of coalbed gas content in geological exploration period. This Standard is applicable to the determination of coalbed gas content and gas composition through coal core during the geological exploration period.

2 Normative References

Through the reference in this Standard, clauses of the following documents become clauses of this Standard. In terms of references with a specific date, all the subsequent modification sheets (excluding the corrected content) or the revised editions are not applicable to this Standard. However, all parties that reach an agreement in accordance with this Standard are encouraged to explore the possibility of adopting the latest version of these documents. In terms of references without a specific date, the latest version is applicable to this Standard.

GB/T 212 Proximate Analysis of Coal (GB/T 212-2008, ISO 11722:1999, NEQ)

GB 474 Method for Preparation of Coal Sample (GB 474-2008, ISO 18283:2006, MOD)

GB/T 3715 Terms Relating to Properties and Analysis of Coal (GB/T 3715-2007, ISO 1213-2:1992, NEQ)

GB/T 13610 Analysis of Natural Gas Composition - Gas Chromatography

GB/T 15663.8 Terms Relating to Coal Mining - Part 8: Mine Safety

3 Terms and Definitions

What is defined in GB/T 15663.8 and GB/T 3715, and the following terms and definitions are applicable to this Standard.

3.1 Coalbed Gas Content Coalbed gas content refers to methane and heavy hydrocarbon gas content that unit mass or unit volume of coal body contains under the original state.

b) Before using the desorption instrument, use suction balloon to raise the liquid level in the measuring tube to the zero point; close the screw clamp (see Figure 2). Then, place it still for 10 min, if the liquid level in the measuring tube remains still, then, it shall be qualified.

4.1.3 Sampling of coal sample Sampling and requirements are as follows:

a) Use common coal core tube to drill-take coal core. The length of coal core taken in one time shall be not less than

0.4 m;

b) After the coal-drilling is completed, during the process of elevating the drilling tool, back-fill flushing fluid into the drill hole; maintain the drill hole often filled with flushing fluid (if this requirement cannot be satisfied because the drill hole severely leaks water, this shall be indicated in the sampling record). The elevating process shall be as continuous as possible. If due to mechanical failure, this process is suspended in the midway, in area where the hole depth is less than 200 m, the suspension time shall not exceed 5 min; in area where the hole depth is 200 m ~ 500 m, the suspension time shall not exceed 10 min;

in area where the hole depth is 500 m ~ 1,000 m, the suspension time shall not exceed 20 min; in area where the hole depth is more than 1,000 m, the suspension time shall not exceed 30 min (conditions of suspension time: under 1/2 hole depth; the medium of well drilling is water or mud);

c) In terms of sampling time, relevant items shall be filled out in details in accordance with the format of Table A.1 in Appendix A. The stipulations of the timing (accurate to min) of several operations are as follows: T1

---drill-elevating time, expressed in (min); T2

---time of elevating drilling tool to the well head (calculated by the finished elevation of the last drilling tool), expressed in (min); T3

---time of starting desorption and determination (calculated by the time of opening the spring clip after the desorption instrument's exhaust tube is connected with the puncture needle), expressed in (min);

d) After coal core is pulled out of the drill hole, disassemble the coal core tube as soon as possible. Fill the adopted coal sample into the sealing tank. The time that the coal core is exposed in the air shall not exceed 8 min;

e) After taking out the coal core, in terms of columnar coal core, adopt an intact part from the middle which contains little gangue; in terms of powdered and blocky coal core, the gangue, mudstone and grinding burnt parts shall be eliminated. Do not use water to clean the coal sample; maintain its natural state, load it into the sealing tank. Do not compact it. The tank mouth shall retain around 10 mm of space;

f) Firstly, insert the puncture needle into the sealing rubber pad, which is above the tank cover, then, use a wrench to screw on the tank cover. Then, connect the desorption instrument's exhaust tube with the puncture needle; immediately open the spring clip 8 (see Figure 2); record this time as T3.

4.2 Determination of Gas Desorption Speed

4.2.1 Gas desorption speed determination device is shown in Figure 2. After the sealing tank connects with the desorption instrument through exhaust tube 9, open the spring clip 8. Soon after that, gas, which leaks out from coal sample, enters the measuring tube. Open the sink's water discharge tube 7; use water drainage and gas collection method to collect gas in the measuring tube.

4.2.2 Within a certain interval, record the reading of the measuring tube and the determination time; maintain consecutive observation for 120 min. The stipulations of the reading interval time are as follows: within 60 min before starting the observation, 1 min ~ 2 min of interval from the 1st point to the 3rd point; after that, at each interval of 2 min ~ 5 min, read once; within the second hour, at each interval of 10 min ~ 20 min, read once.

4.2.3 If the volume of the measuring tube is not sufficient to contain all the gas, which leaks out from coal sample within 120 min, use spring clip 8 to firmly clamp the exhaust tube in the midway, re-elevate the liquid level to the measuring tube's zero point, meanwhile, supply sufficient clean water into the sink. Then, open the spring clip, continue the observation.

4.2.4 The above-mentioned observation shall be conducted in places with relatively stable temperature. The sealing tank shall receive thermal insulation and anti-freezing treatment.

4.2.5 If under the observation with the desorption instrument, no gas is discharged, examine whether the puncture needle, the exhaust tube and the upper gas vent of the sealing tank are blocked. If they are not blocked, then, it is caused by an excessively small content of gas. At this moment, the observation may be terminated; submit it to the laboratory for determination.

4.2.6 After the above-mentioned observation is completed, pull out the puncture needle, slightly screw the compression screw (apply moderate force; avoid becoming too tight, which will make the rubber pad lose its elasticity). Fill out the observation result in the table of record (see Appendix A.2); record the temperature of the gas and water, and atmospheric pressure.

5 Record and Sample Delivery

5.1 Attached Documents of Coal Sample Attached documents are as follows:

- a) Sampling record table (see Table A.1 in Appendix A);
- b) Coal sample gas desorption speed determination record table (see Table A.2 in Appendix A);
- c) Gas loss calculation chart and calculation result;
- d) Gas coal sample delivery note (see Table A.3 in Appendix A). The above-mentioned documents shall be in duplicate: after the sample delivery organization's review, one copy shall be provided to the test organization, the other copy shall be kept by the sample delivery organization.

5.2 Sampling Record Sampling record shall simply describe the geological condition (structure, igneous rock, lithology of seam roof and floor) of the sampling location, and coal quality (grain size, degree of contamination and physical properties, etc.); indicate unforeseen circumstances in sampling and tests.

5.3 Coal Sample Tank Marking and Coal Sample Preservation Use steel seal to mark the number and the organization. The sample delivery organization shall uniformly number it and load it into a specially-made sample box for delivery. The box shall be filled with thermal insulation materials. Preserve it at room temperature (20 °C). Relevant documents of samples and tests shall be delivered to the test organization within 2 d ~ 3 d.