GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 73.040

D 21

GB/T 5450-2014

Replacing GB/T 5450-1997

Audibert-Arnu dilatometer test of bituminous coal

烟煤奥阿膨胀计试验

(ISO 349:1975, Hard coal - Audibert-Arnu dilatometer test, MOD)

Issued on: June 09, 2014 **Implemented on: October 01, 2014**

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

Standardization Administration of PRC.

Table of Contents

Audibert-Arnu dilatometer test of bituminous coal

1 Scope

This standard specifies the terms and definitions, method summary, reagents and materials, instruments and equipment, specimens, test procedures, expression of results, method precision of Audibert-Arnu dilatometer test of bituminous coal.

This standard applies to bituminous coal.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this standard.

GB 474 Preparation of coal sample

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

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Softening temperature

T_1

The temperature at which the dilatation rod drops 0.5 mm.

3.2

Temperature of maximum contraction

T_2

The temperature at which the dilatation rod starts to rise after falling to the lowest point.

3.3

Solidification temperature

T_3

The temperature at which the dilatation rod stops moving.

3.4

Maximum contraction of length of pencil

α

The percentage of maximum distance that the dilatation rod descends to the length of the coal pencil.

3.5

Maximum dilatation of length of pencil

b

The percentage of maximum distance that the dilatation rod rises to the length of the coal pencil.

4 Method summary

The test coal sample is made into a coal pencil of a certain specification according to the prescribed method, placed in a standard caliber tube (dilatation tube), on which a steel rod (dilatation rod) that can slide freely in the tube is placed. The above device is placed in a special electric furnace, heated at the specified heating rate. The displacement curve of the dilatation rod is recorded. According to the displacement curve, the maximum dilatation of length of pencil (b) and the maximum contraction of length of pencil (a) are obtained. Figure 1 shows a typical dilatation curve.

7.3 Inspection of forming mold

The gauge can be used to check the wear of the forming mold used in the test. Meanwhile it can also be used to check the new forming mold. If it inserts the gauge from the large-diameter end of the forming mold being inspected, it can observe:

a) When there are two lines, the forming mold is too small and shall be reprocessed;

b) When there is one line, the forming mold is suitable for use;

c) When there is no line, the forming mold is worn and shall be replaced.

7.4 Inspection of dilatation tube

Compare the dilatation tube and dilatation rod that have been measured 100 times with the results of 4 coal samples measured by a new set of dilatation tube and dilatation rod. If the absolute value of the average value of the relative difference is greater than 3.5, the old tube and old rod are discarded. If the dilatation tube and dilatation rod are still applicable, re-check it every 50 measurements thereafter. See Appendix C for details of dilatation tube inspection.

8 Test procedure

8.1 Coal pencil preparation

8.1.1 Use a braid brush to wipe the forming mold clean. Use a wax coating rod to apply a thin layer of wax on the inner wall of the forming mold. Weigh 4 g of the coal sample for general analysis and test. Place it in a small evaporating dish. Use 0.4 mL of water to wet the specimen. Mix it quickly and prevent the presence of air bubbles. Then put the small-diameter end of the forming mold downwards and place it on the mold holder. Put the funnel on the small-diameter end. Use a horn spoon to pull the specimen down the side of the funnel, until the forming mold is filled. Scrape the remaining specimen back into the small evaporating dish. Press the striker guide plate horizontally on the funnel. Use the striker rod to compact the specimen in the perpendicular direction.

Note: During the compaction process, prevent the specimen from splashing out or the striking rod from getting stuck.

8.1.2 Place the entire set of forming molds under the striker. First use a long striker rod to strike it 4 times. Then add specimen and strike it for another 4 times. Use the long, medium and short striker rods to strike it 2 times in

recorded every 5 min.

8.2.3 After the specimen begins to solidify (the dilatation rod stops moving), continue to heat for 5 minutes. Then stop heating. Immediately remove the dilatation tube and the dilatation rod from the furnace. Place them vertically on the shelf, respectively.

8.3 Cleaning of dilatation tube and dilatation rod

8.3.1 Dilatation tube

Remove the wire plug at the bottom of the dilatation tube. Use a metal rod with an axe-shaped head to remove the semi-coke in the tube. Then use a copper wire brush to clean the remaining semi-coke powder in the tube. Then use a braid brush to wipe it off, until the inner wall is smooth and bright. When the tube is not easy to wipe, the tube can be filled with crude benzene or other suitable solution, then wiped clean after soaking for several hours.

8.3.2 Dilatation rod

Using fine sandpaper to wipe off the tar residue adhering to the dilatation rod. Be careful not to round the edges and corners. Finally check whether the dilatation rod can slide freely in the tube.

9 Expression of results

9.1 Type judgment and result calculation of recording curve

Figures 10 ~ 13 respectively show four types of recording curves for positive dilatation, negative dilatation, contraction only, tilt contraction in the bituminous coal dilatometer test. According to the curve of the test record, read three characteristic temperatures: softening temperature (T_1) (see 3.1), temperature of maximum contraction (T_2) (see 3.2), solidification temperature (T_3) (see 3.3). Calculate the maximum contraction of length of pencil (α) (see 3.4) and maximum dilatation of length of pencil (b) (see 3.5). The type of test record curve of bituminous coal dilatometer is determined and expressed according to the following methods:

a) If the maximum returning height of the dilatation rod after the contraction is higher than the starting position of lowering, the maximum dilatation of length of pencil is expressed as "positive dilatation" (Figure 10);

b) If the maximum returning height of the dilatation rod after the contraction is lower than the starting position of lowering, the maximum dilatation of length of pencil is expressed as "negative dilatation". The dilatation is calculated as the difference between the final position of dilatation and the

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------