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

**GB/T 7702.3-2008**

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**Test method for granular activated carbon from coal --  
Determination of hardness  
(English Translation)**

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### Foreword

GB/T 7702 "Test Method for Granular Activated Carbon from Coal" is divided into.

- Part 1.Determination of Moisture;
- Part 2.Determination of Particle Size;
- Part 3.Determination of Hardness;
- Part 4.Determination of Packing Density;
- Part5.Determination of Absorption of Water;
- Part 6.Determination of Methylene Blue Absorption;
- Part 7.Determination of Iodine Number;
- Part 8.Determination of Phenol Absorption;
- Part 9.Determination of Ignition Temperature;
- Part 10.Determination of Service Life against Benzene and Chloroethane Vapors;
- Part 13.Determination of CCL4 Vapor Absorption;
- Part14.Determination of Sulphur Capacity;
- Part 15.Determination of Ash Content;
- Part 16.Determination of pH Value;

- Part 17.Determination of Floatation Ratio;
- Part 18.Determination of Caramel Absorption;
- Part 19.Determination of Carbon Tetrachloride (CCl<sub>4</sub>) Desorption;
- Part 20.Determination of Pore Volume and Specific Surface Area.

This Part is part 3 of GB/T 7702.

This Part modifies and adopts ASTM D 3802.1979 "Standard Test Method for Ball-Pan Hardness of Activated Carbon" (reconfirmed in 2005). Compared with ASTM D 3802.1979, the major technical differences are as follows.

- a) The volume of sample is adjusted to 50mL;
- b) The sample wearing method is changed to ball-milling method;
- c) Technical requirements of hardness tester are added.

This Part replaces GB/T 7702.3-1997 "Standard Test Method for Hardness of Granular Activated Carbon from Coal - Determination of Hardness".

Compared with GB/T 7702.3-1997, the main changes of this Part are as follows.

- a) Structure of this standard is adjusted according to GB/T 1.1-2000 "Directives for Standardization - Part 1.Rules for the Structure and Drafting of Standards" and GB/T 20001.4-2001 "Rules for Drafting Standards - Part 4.Methods of Chemical Analysis";
- b) This revision combines the ASTM standard ASTM D 3802.1979 "Standard Test Method for Ball-Pan Hardness of Activated Carbon" (reconfirmed in 2005) with the actual situation of China.
- c) The volume of sample is adjusted to 50mL;
- d) The sample wearing method is changed to ball-milling method;
- e) Technical requirements of hardness tester are added.

This Part was proposed by and shall be under the jurisdiction of China North Industries Group Corporation.

Drafting organization of this Part. Shanxi Xinhua Chemicals Co., Ltd.

Chief drafting staffs of this Part. Zhang Xu, Li Weibing, Yuan Yidong, Zhao Honghai,

Zhao Jijun, Chi Guangxiu, and Li Ruomei.

The historical editions replaced by this Part are as follows.

- GB/T 7702.3-1987, and GB/T 7702.3-1997.

Test Method for Granular Activated Carbon from Coal -  
Determination of Hardness

## 1 Scope

This Part specifies the contents such as determination principle, determination procedure and result calculation of the granular activated carbon from coal.

This Part is applicable to the determination of hardness of granular activated carbon from coal (hereinafter referred to as activated carbon).

## 2 Principle

Under specified conditions, the sample is placed in a roller with a number of stainless steel balls. Through mechanical rotation, the sample is worn. Determine the changing conditions of the particle size of worn sample. Use the percentage OF the sample mass retained on the test sieve TO the original sample mass AS the sample hardness.

**3.1 Hardness tester (see Figure 1). The roller speed of the hardness tester is 50r/min $\pm$ 2/min.**

**4.1 Adopt quartering method to take about 200mL of sample. Place the sample into**

the 150°C $\pm$ 5°C electrothermal constant-temperature drying box and dry for 2h (samples whose moisture meets the product requirements do not need to be dried). Then take out the sample and place it into the dryer for cooling and later use.

**5.1 Take 50mL of screened sample with the measuring cylinder. Weigh it on the balance, accurate to 0.1g.**

**5.2 Place the weighed sample into the roller with 5 steel balls in it. Tighten the roller**

cover and place the roller on 2 rotating shafts of the hardness tester.

**5.4 Take down the roller. Take out the steel balls (the sample must not be brought out).** Transfer the sample onto the selected test sieve.

## **6 Result Calculation**

Hardness is measured by mass fraction  $w$ . The value is expressed in % and is calculated according to Formula (1).

**7.1 Two parallel determinations of the specimen shall be made for each sample. The**

result is expressed by the arithmetic mean. Calculation result is accurate to the integer.

## **8 Test Report**

The test report shall include the following contents.

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