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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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# GB/T 1573-2018

Replacing GB/T 1573-2001

## Determination of the thermal stability of coal

煤的热稳定性测定方法

**Issued on: February 6, 2018** **Implemented on: September 1, 2018**

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

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## 1 Scope

China's national method for determining the thermal stability of coal - the property that decides whether a lump of coal survives being heated or shatters into fines. It specifies the method summary, the apparatus, the sample, the determination procedure, the expression of results, the precision and the test report, and it applies to lignite, anthracite and non-caking bituminous coal. Thermal stability is the property that matters wherever coal is burned or gasified as lump rather than as pulverised fuel: in a fixed-bed gasifier, in a lump-fired boiler, in a cupola. When lump coal is dropped into a hot bed it heats rapidly, moisture flashes off and the internal stresses split it. If the coal is thermally stable the lumps stay whole and the bed remains permeable; if it is not, the lumps decrepitate into fines, the fines pack the voids, the gas channels through the bed or the resistance rises, and the plant loses capacity and burns unevenly. The test reproduces the shock directly: a sized fraction of lump coal is dried, weighed, dropped into a furnace held at a specified temperature and kept there for a fixed time, then cooled and screened. The result is expressed as the mass fraction of the material that remains above the specified size - the higher the fraction, the more stable the coal. Because the answer depends entirely on the conditions of the shock, the standard fixes the size of the charge and the size fraction, the furnace temperature and the residence time, the way the sample enters the furnace, the cooling, and the screen apertures used to separate the product. Precision limits for repeatability and reproducibility are given so that two laboratories can be compared. Issued on 6 February 2018 and in force since 1 September 2018, it replaces GB/T 1573-2001.

This Standard specifies the method summary, apparatus, samples, determination procedures, result expression, method precision and test report for the determination of



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thermal stability of coal. This Standard applies to lignite, anthracite and non-caking bitumite.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this document.

GB/T 474, Method for preparation of coal sample

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

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions and those defined in GB/T 483 apply.

3.1 thermal stability A measure of the ability to maintain a specified particle size after heating of coal. Under specified conditions, for coal sample of a certain particle size after heating, the mass fraction of the mass of residual coke of particle size greater than 6 mm accounted for the total of the masses of residual coke of all particle sizes is deemed as the thermal stability index (TS+6); the mass fraction of the mass of residual coke of particle size 3 mm ~ 6 mm and less than 3 mm accounted for the total of the masses of residual coke of all particle sizes is deemed as the auxiliary index of thermal stability (TS3~6, TS-3). NOTE. Rewrite Definition

3.3.22 of GB/T 483-2007.

## 6 Sample

Prepare about 2 kg of air-dried coal sample of particle size 6 mm ~ 13 mm in accordance with GB/T 474; carefully screen out the coal sample of particle size less than 6 mm; divide into two after mixing up.

## 7 Determination procedures

7.1 Use crucibles to take 500 cm3 of coal sample from two shares of coal sample respectively; weigh (accurate to

0.02

g) and make the difference in the masses of the two coal samples not greater than 1 g. Place each coal sample into 5 crucibles; put on the crucible cover and place the crucibles on the crucible holder. For the repeated determination of each sample, it shall not be heated in the same furnace.

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7.2 Rapidly put the crucible holder holding crucibles into the constant-temperature zone of the muffle furnace which has been heated to 900°C; shut the furnace door; adjust the furnace temperature to 850°C, to heat the samples for 30 min at the temperature exactly. After the crucibles and crucible holder are in place, it is required that the furnace temperature is recovered to (850 ± 15)°C within 8 min; maintain it at (850 ± 15)°C after this. Or else, the test is void. The heating time includes the temperature recovery time.

7.3 Take the crucibles from the muffle furnace; cool to room temperature; immediately weigh the total mass of each share of residual coke (accurate to

0.02 g).

7.4 Overlap the screens of mesh sizes 6 mm and 3 mm and bottom tray on the sieve shaker; pour one share of residual coke weighed into the 6 mm screen; put on the sieve cover and fix it.

7.5 Start the sieve shaker for screening for 10 min.

**7.6 Weigh respectively the masses (accurate to**

0.02

g) of all grades of residual coke of particle size 6 mm, 3 mm ~ 6 mm and less than 3 mm. Compare the total of the masses of residual coke of all particle sizes and the total mass of residual coke before screening, and the difference between the two shall not exceed ± 1 g, or else, the test is void.

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