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GB/T 2565-2014

Replacing GB/T 2565-2014

Determination of grindability index of coal – Hardgrove method

(ISO 5074:1994, Hard Coal –

Determination of Hardgrove grindability index, MOD)

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Foreword

This standard was drafted in accordance with the rules given in GB/T1.1-2009.

This standard replaces GB/T 2565-1998 "Determination of grindability index of coal - Hardgrove method". As compared with GB/T 2565-1998, the main changes are as follows:

- ADD the introduction, reagents and materials, and test reports (SEE Introduction, Chapter 4, and Chapter 11);
- ADD the requirements for air drying of coal samples during sample preparation (SEE 6.2);
- ADD the use of a linear regression equation to calculate the Hardgrove grindability index (SEE C.2 of Appendix C).

This standard, using the redrafting method, modifies and adopts ISO 5074:1994 Hard Coal - Determination of Hardgrove grindability index.

As compared with ISO 5074:1994, this standard has some structural changes, AND Appendix A provides the clause number comparison between this standard and ISO 5074:1994.

There are technical differences between this standard and ISO 5074:1994, and the terms involved in these differences have been indicated by a vertical single line (|) in the blank position on the outside margin. AND Appendix B provides the list of the corresponding technical differences and their causes.

This standard was proposed by China Coal Industry Association.

This standard shall be under the jurisdiction of the National Coal Standardization Technical Committee (SAC/TC 42).

The drafting organizations of this standard: Coal Science Research Institute - Detection and Research Branch, Shenhua Sales Group Co., Ltd.

The main drafters of this standard: Yang Huayu, Zhang Yunhong, Zhang Baoping, Xue Junhai, Wang Zhenhua.

GB/T 2565-1998 replaces the standard previously issued as follows:

- GB 2565-1981; GB 2565-1987.

Introduction

The grindability index of coal is a comprehensive manifestation of the physical properties of coal, such as hardness and strength, AND is generally measured by the Hardgrove method (Hardgrove grindability index tester, referred to as Hardgrove apparatus), in order to assess the difficulty of grinding coal into powder.

Two important factors influencing the reliability of the grindability index determination results of coal are the coal sample preparation method (coal sample particle size range) and the moisture content in the coal.

The grindability index of coal can be used to assess the yield and energy consumption of industrial pulverizers.

Determination of grindability index of coal – Hardgrove method

1 Scope

This method specifies the method summary, reagents and materials, instruments and equipment, coal sample preparations, instrument calibration, determination procedures, result calculation, method precision, and test report, etc., of using the Hardgrove methods (hereinafter referred to as the Hardgrove method) to determine the grindability index of coal.

This standard applies to bituminous coal and anthracite.

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 Method for preparation of coal sample

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

GB/T 6003.1 Test sieves - Technical requirements and testing - Part 1: Test sieve of metal wire cloth

GB/T 19494.2 Mechanical sampling of coal - Part 2: Method for sample preparation

3 Method summary

The coal sample of a certain particle size range and mass is sieved under the specified conditions after being grinded by the Hardgrove grindability tester, the mass of coal sample remaining on the sieve is weighed, the mass of the coal sample passing through the sieve is obtained by deducting the mass of the coal sample remaining on the sieve from the mass of coal sample before grinding, AND it may find the Hardgrove grindability index of the coal from the standard diagram as drawn from the Hardgrove grindability index standard substance of coal or calculate through the unary linear regression equation.

re-preparation, it can conduct test, BUT it shall indicate the sampling rate, AND the result is for reference only.

6.5 As for the prepared 0.63 mm ~ 1.25 mm coal sample, CONDUCT air drying using the air drying method as specified in GB 474; after reaching to the air drying state, FOLLOW Chapter 8 to conduct determination.

7 Instrument calibration

7.1 USE the Hardgrove grindability index standard substance of the coal to calibrate the Hardgrove tester at least once every year using the methods as specified in Appendix C.

7.2 In case of changing the operators and instruments, renewing or repairing the equipment (including the test sieve), OR having doubt of the determination results, it shall use the Hardgrove grindability index standard substance of the coal to conduct calibration.

8 Determination steps

8.1 Test RUN the Hardgrove tester to check whether it is normal, AND the tester shall be able to automatically stop running after (60 ± 0.25) r; CHECK the surface of the 0.071 mm sieve and REPLACE it if it is loosened.

8.2 USE the short hair brush to thoroughly clean the grinding bowl, grinding ring and steel ball, and MAKE the steel ball distribute into the groove of the grinding bowl as evenly as possible.

8.3 MIX the 0.63 mm ~ 1.25 mm coal samples evenly; USE the riffle to reduce 120 g; USE the 0.63 mm sieve to make it subjected to sieving on the vibrating sieving machine for 5 min, in order to eliminate the coal powder less than 0.63 mm; USE the riffle again to reduce two coal samples with each mass not less than 50 g.

8.4 WEIGH (50 ± 0.01) g of the coal sample (m) which had been removed of coal powder, accurate to 0.01 g. POUR the coal powder evenly into the grinding bowl; FLATTEN its surface; USE the short hair brush to clear the coal sample falling onto the steel ball and the grinding bowl projections to the steel ball surroundings; when the cross groove of the grinding ring is basically in line with the cross head at the lower end of the main shaft direction, PLACE the grinding ring in the grinding bowl.

Appendix C

(Normative)

Calibration of Hardgrove tester

C.1 USE the 4 Hardgrove grindability index standard substance of coal to calibrate the Hardgrove tester, and MAKE the calibration diagram or CALCULATE the unary linear regression equation parameters.

C.1.1 USE the Hardgrove tester to be calibrated to conduct determination of the 4 Hardgrove grindability index standard substance of coals, with each Hardgrove grindability index standard substance of coal being repeatedly determined for 4 times; CALCULATE the mass of the substance passing through the 0.071 mm sieve; CALCULATE four times of the arithmetic mean of the mass of the substance passing through the 0.071 mm sieve.

C.1.2 On the rectangular coordinate system drawing, USE the arithmetic mean of the mass of the substance passing through the 0.071 mm sieve as determined four times as the ordinate AND the corresponding Hardgrove grindability index standard substance as the abscissa to draw the test data of the Hardgrove grindability index standard substance of the coal based on the least square method. The resulting line is the calibration chart of the Hardgrove tester (sieve, etc.) used. It may also use the unary linear regression equation to express the calibration curve (Hardgrove grindability index is the dependent variable AND the average of the mass of the substance passing through the sieve is the independent variable), with the correlation coefficient (r) of the unary linear regression equation at least 0.99.

C.2 Based on the mass of the substance passing through the coal sample sieve, USE the calibration chart or the unary linear regression equation to calculate the Hardgrove grindability index of the coal sample to be determined.

Note: The least squares method is the minimum distance square from each determination point on the chart along the y axis to this line.

Example: Assume that the data of the grindability index standard substance of the 4 coal samples as determined using this unit Hardgrove tester in a certain lab is as shown in Figure C.1.

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