

ICS 27.100
CCS D 21

DL

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

DL/T 2029-2019

**Determination of total moisture in coal by automatic
instrumental method**

煤中全水分测定自动仪器法 清晰版
(English Translation)

Issued on: June 4, 2019

Implemented on: October 1, 2019

Issued by: National Energy Administration

Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Method summary	
5 Reagents and materials	
6 Equipment	
7 Laboratory conditions	
8 Specimen	
9 Measurement procedure	
10 Result calculation	
11 Method precision	
12 Water loss compensation	
13 Test report	
Appendix A (informative appendix) Schematic diagram of the structure of the automatic determination of total moisture	

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 "Guidelines for Standardization Work Part 1: Standard Structure and Compilation".

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Electric Power Plant Chemical Standardization Technical Committee.

Drafting organizations of this standard. Xi'an Thermal Power Research Institute Co., Ltd., State Grid Hubei Electric Power Co., Ltd. Electric Power Research Institute, Changsha Kaiyuan Instrument Co., Ltd., Guodian Nanjing Coal Quality Supervision and Inspection Co., Ltd., Huadian Electric Power Research Institute Co., Ltd.

1 Scope

This standard specifies methods for automatically determining the total moisture in coal using various special instruments and equipment.

The nitrogen drying method specified in this standard is applicable to anthracite, bituminous coal and lignite; the air drying method is applicable to anthracite and dry ash-free base volatilization Less than 20% bituminous coal.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 211-2017 Method for determination of total moisture in coal GB/T 474 Coal sample preparation method GB/T 18510 Coal and Coke Test Alternative Method Confirmation Criteria GB/T 19494.2 Coal mechanized sampling Part 2: Preparation of coal sample GB/T 19494.3 Mechanized coal sampling Part 3: Precision measurement and bias test

3 Terms and definitions

The following terms and definitions apply to this document.

Full automatic instrument After the full moisture sample of the specified particle size and quality is placed in the specified position during the test, all test operation packages can be automatically completed according to the specified procedure Including equipment for sample mixing, aliquoting, weighing, drying, result calculation and reporting.

Semi automatic instrument in the test, in addition to the mixing, dividing and weighing of the full moisture sample, the other test operations include drying and drying of the sample.

The subsequent weighing, result calculation and report can be automatically completed in accordance with the specified procedures.

Thermo gravimetric analyzer Under program temperature control, an analytical instrument that determines the relationship between the mass of a sample and the temperature and time changes.

Full automatic thermo gravimetric analysis instrument A fully automatic instrument for measuring total moisture in coal using a thermogravimetric analyzer.

Buoyancy effect

When an object that does not undergo chemical changes under the action of heat is heated

to a high temperature, it is affected by the shape of the object, gas density, flow rate and temperature.

The phenomenon that the apparent quality of the object changes relative to the normal temperature conditions in the laboratory under the influence of factors such as temperature.

4.1 Overview

A certain mass of all-moisture sample is heated and dried to a constant mass under the specified temperature and atmosphere conditions, according to the mass change of the sample before and after drying Calculate the total moisture.

4.2.1 Method A1.Nitrogen drying

Use a fully automatic instrument to automatically mix, divide and accurately weigh a certain mass of 6mm full moisture sample in a shallow pan, and send it to the drying oven Inside, heated at (105~110)°C, dry and oxygen-free nitrogen stream to a constant mass, according to the mass change and buoyancy effect of the sample before and after drying the value is calculated for total moisture.

4.2.2 Method A2.Air drying

Use a fully automatic instrument to automatically mix, divide and accurately weigh a certain mass of 13mm or 6mm full moisture sample in a shallow dish, and send it Put it into the drying box and heat it to a constant mass at (105~110)°C in a stream of dry air. According to the mass change and buoyancy effect of the sample before and after drying Calculate the total moisture by value.

4.3.1 Method B1.Nitrogen drying

Using a semi-automatic instrument, accurately weigh a certain mass of 6mm full moisture sample in a crucible and place it on the sample holder in the drying room.

Heated at (105~110)°C, dry oxygen-free nitrogen flow until the mass is constant, calculated according to the mass change before and after drying and the value of buoyancy effect Full moisture.

4.3.2 Method B2.Air drying

Using a semi-automatic instrument, accurately weigh a certain mass of a 6mm or 13mm full moisture sample with a particle size and place it on the sample holder in the drying room.

Heated at (105~110)°C in a stream of dry air to a constant mass, calculate the total water based on the mass change before and after drying and the buoyancy effect value Minute.

4.4.1 Method C1.Nitrogen drying

Using a fully automatic thermogravimetric instrument, accurately weigh a certain mass of 6mm full moisture sample with a particle size and send it to the balance pan in the drying chamber of the thermogravimetric analyzer Above, heat to a constant mass at a specified temperature and in a dry oxygen-free nitrogen stream, and calculate the total mass according to the mass change before and after drying and the buoyancy effect value.

Moisture.

4.4.2 Method C2.Air drying

Using a fully automatic thermogravimetric instrument, accurately weigh a certain mass of 6mm full moisture sample with a particle size and send it to the balance pan in the drying chamber of the thermogravimetric analyzer Above, it is heated to a constant mass at the specified temperature and air flow, and the total moisture is calculated according to the mass change before and after the sample is dried and the buoyancy effect value.

5 Reagents and materials

5.1

Pure nitrogen [GB/T 8979]. The purity is greater than 99.99%, and the oxygen content is less than 0.01%.

5.2

Color-changing silica gel [HG/T 2765.4]. Irregular spherical shape, particle size (2~5) mm.

6.1.1 General

The fully automatic instrument is mainly composed of a sample reduction device, a manipulator, a drying oven, an electronic balance and a control device, etc., see Appendix A Figure A.1a),

b) as shown. It shall be capable of realizing local or remote status monitoring, automatic emergency shutdown, automatic control and feedback, automatic diagnosis and alarm, automatic acquisition Collection and data management functions.

6.1.2 Divider

The scaler should meet the following basic requirements.

- a) The design and manufacture should meet the relevant requirements of GB/T 19494.2;
- b) Bias and precision tests should be carried out in accordance with the relevant provisions of GB/T 19494.3 to prove that there is no total moisture bias, and the reduction and test variances are not Greater than 0.03;