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**Technical specification of fuel trial burn test for semi-industrial  
pilot-plant circulating fluidized bed boiler  
(English Translation)**

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## Table of Contents

|                                                                       |
|-----------------------------------------------------------------------|
| Foreword                                                              |
| 1 Scope                                                               |
| 2 Normative references                                                |
| 3 Terms and definitions                                               |
| 4 Test equipment and preparations                                     |
| 5 Test method and content                                             |
| 6 Test data recording and processing                                  |
| 7 Test result analysis and report writing                             |
| Appendix A (informative appendix) test bench test outline             |
| Appendix B (informative appendix) the main content of the test report |

### Foreword

This part is drafted in accordance with the rules given in GB/T 1.1-2016 "Guidelines for Standardization 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 part was proposed by the China Electricity Council.

This part is under the jurisdiction of the Power Plant Boiler Standardization Technical Committee (DL/T C08).

Drafting organization of this section. China Huaneng Group Clean Energy Technology Research Institute Co., Ltd.

### 1 Scope

This part specifies the semi-industrial circulating fluidized bed (Circulating fluidized bed, CFB) boiler combustion test bed (abbreviated as "CFB "Combustion test bench") fuel trial burning test method.

This part is applicable to fuel test burning test of CFB combustion test bench with thermal power of 1MW and above, and CFB burning test for other purposes.

Bench inspection can be implemented by reference.

## 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 modified versions) applies to this document.

GB/T 212 Coal Industrial Analysis Method GB/T 213 Method for measuring calorific value of coal GB/T 214 Method for determination of total sulfur in coal GB/T 219 Method for measuring coal ash fusibility GB/T 474 Coal sample preparation method GB/T 475 Commercial coal sampling method GB/T 477 Coal screening test method GB/T 1574 Method for analysis of coal ash composition GB/T 2565 Coal Grindability Index Determination Method GB/T 3286 Limestone and Dolomite Chemical Analysis Method GB/T 10184 Specification for performance test of power station boilers GB/T 13283 Accuracy level of testing instruments and display instruments for industrial process measurement and control GB/T 16157 Determination of particulate matter in exhaust from stationary sources and sampling method of gaseous pollutants DL/T 465 Test method for erosion and wear index of coal DL/T 568 Quick analysis method for test coal elements DL/T 964 Circulating fluidized bed boiler performance test specification

## 3 Terms and definitions

The following terms and definitions apply to this section.

Bed material

The solid particles with a certain thickness and a certain particle size are laid on the air distribution board before the fluidized bed is ignited. Bed material is generally recycled Circulating fluidized bed boiler bottom slag or river sand.

Circulating material the separator separates the materials returned to the furnace through the return system and the materials accumulated in the furnace itself.

Fluidized velocity

Assuming that there is no material in the fluidized bed, the air (or flue gas) passing through the empty section velocity of the furnace.

### 4.1 Test device and system

#### 4.1.1

Refer to Figure 1 for the CFB combustion test bench system. The cross-sectional area of the furnace body should be greater than 0.08m<sup>2</sup>, in order to ensure sufficient fuel combustion stroke and the residence time, the effective height of the furnace should be

greater than 18m (fluidization velocity 3.5m/s-5m/s). Each section of the combustion chamber (11) should be equipped with temperature adjustment devices (water the cooling device (7) adjusts the inlet temperature of the separator to achieve a temperature range of 400°C~1000°C to simulate the actual furnace combustion conditions.

#### 4.1.2

The CFB combustion test bench should be equipped with coal feeding system, air and smoke system, dust collector and cooling water system, etc., to ensure that the test bench has perfect Features.

#### 4.1.3

The CFB combustion test bench should be equipped with a data acquisition system, and DCS should be used for centralized monitoring.

#### 4.1.4

CFB combustion test bench SNCR denitration reducing agent can be selected in the horizontal flue between the outlet of the combustion chamber (11) and the high temperature separator (13) Point spray in.

Fig. 1 Reference diagram of CFB combustion test bench system

## 4.2 Test equipment requirements

### 4.2.1

The accuracy requirements of CFB combustion test bench test instrument are.

- a) Primary air flow meter. accuracy level is 4;
- b) Primary wind temperature meter. accuracy level is 2.5;
- c) Secondary air flow meter. accuracy level is 4;
- d) Secondary air temperature meter. accuracy level is 2.5;
- e) The temperature gauge of each section of the furnace wall (the thermocouple is embedded in the furnace wall). the accuracy level is 0.5%;
- f) The smoke temperature thermometer for each section (the thermocouple is embedded in the flue). the accuracy level is 0.5%.

The accuracy requirements of other test instruments shall be implemented in accordance with the requirements of GB/T 13283.

### 4.2.2

The CFB combustion test bench should be equipped with an online flue gas analyzer, which should be able to simultaneously measure the O<sub>2</sub>, CO<sub>2</sub>, CO, SO<sub>2</sub>, NO<sub>2</sub>, NO, N<sub>2</sub>O in the flue gas and other important gas components for measurement. The on-line measuring

instrument for flue gas composition should adopt suction sampling method for sampling analysis and measurement. The sampling tube should Set the heat tracing tube, and the specific sampling method shall be implemented in accordance with GB/T 16157.

#### **4.2.3**

According to the needs, the CFB combustion test bench can be additionally equipped with test instruments or flue gas collection equipment. For other flue gas components of the test fuel, for example, gaseous harmful trace elements and HCl, HF, dioxins, etc. are collected and measured online or sent to the laboratory for testing after sampling.

### **4.3 Inspection and preparation of test equipment condition**

#### **4.3.1**

Check that the test device and system have the starting conditions, and record the status of the main equipment components and related auxiliary equipment.

#### **4.3.2**

When conducting special combustion tests, the CFB combustion test bench shall complete necessary improvements as required.

#### **4.3.3**

Check the related measurement meters and measurement systems of the CFB combustion test bench, and complete the verification and calibration of the necessary test instruments and systems.

#### **4.3.4**

Complete preparations for test fuels, desulfurizers (limestone, etc.), denitration reducing agents (urea solution, ammonia, etc.), including testing the fuel and desulfurizer are prepared into appropriate particle sizes and sampled and analyzed.

#### **4.3.5**

Prepare the fuel (gas) required for ignition.

#### **4.3.6**

Prepare qualified starting bed material.

### **4.4.1 Sampling and testing of test fuel and limestone shall meet the following requirements**

a) After the test fuel arrives at the CFB combustion test bench, multi-point sampling is performed on site. Sampling 2kg at each point and place in a sealed container in the vessel, after sampling, the quartering method is used to mix and reduce into 4 parts, each 2kg. 1 copy each for the test party and the owner, keep the bottom for future use 2 servings. The specific sampling methods of test fuel, limestone, ash, etc. shall be