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GB/Z 21193.3-2007

**Fossil-fired steam power stations -- Part 3: Steam-temperature
controls**

(English Translation)

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Foreword

GB/Z21193 "Mineral Combustion Steam Power Station" is divided into the following parts.

- Part 1. Limiting control;
- Part 2. Drum water level control;
- Part 3. Steam temperature control.

This part is the third part of GB/Z21193.

This part is equivalent to IEC/T R62140-3.2002 "Mineral Combustion Steam Power Station Part 3. Steam Temperature Control" (English version).

For ease of use, the following editorial changes have been made to IEC/T R62140-3.2002.

- a) the words "technical report" were replaced by the words "guidance technical documents";
- b) delete the preface to IEC/T R62140-3.2002;
- c) Delete the introduction to IEC/T R62140-3.2002.

This part was proposed by the China Machinery Industry Federation.

This part is under the jurisdiction of the Second Technical Committee of the National Industrial Process Measurement and Control Standardization Technical Committee.

This section is responsible for drafting the unit. Southwest University.

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Introduction

This part is part of GB/Z21193, which contains the correct design and operation of the control circuit for the mineral burning power station.

Suggestions. They are based on the technical solutions currently used, and in order to understand them correctly, this section also presents the necessary backs.

Scene information.

This section proposes or includes special technical solutions, primarily for functions that meet similar user needs. Form a recognition the method to represent the functional needs of operators and suppliers of mineral burning power plants. This section is strictly regarded as being given within the time given.

An example of a specific technical solution is to encourage discussion on the topic and promote discussion.

There are two types of instructional technical documents in GB/Z21193.

The first type of guidance technical document relates to the special control loop of the boiler, such as drum water level control or steam temperature control, and the normal operating conditions in which they are located.

The second type of guidance technical document points out special ways to ensure proper operation under restricted conditions, such as rising and falling During the period, or in abnormal operating conditions, or they are related to the furnace control system, such as load control system or frequency control system. These ones Guidance technical documents usually group power plant units as a whole.

Each part of GB/Z21193 is independent of each other, however, their content is largely coordinated. This department Columns can be added.

GB/Z21193.3-2007/IEC/TR62140-3:2002 Mineral burning steam power station Part 3.
Steam temperature control

1 Scope

The subject of this section is the natural-cycle or forced-circulation of mineral-fired steam power station steam temperature control.

The application of this part is limited to the power station temperature control system, in which the steam side control such as water spray desuperheater is used.

Or a heat exchanger, or a flue gas side control such as flue gas recirculation, to control superheated steam to reach a desired target temperature. Superheated steam desuperheating station and this Partially unrelated.

After the description of the controlled system is a systematic description of the control task, the following chapter contains a description suitable for the configuration of the control loop.

The last part focuses on the inspection of the control loop measuring equipment and actuators.

2 Charged system

In order to maintain turbine efficiency and avoid turbine metal temperature fluctuations over a wide range of load changes, the entire expected operation is required. Keep the temperature of the superheated steam and the reheated steam constant within the load range. To meet such requirements, it is necessary to have a steam temperature control.

system. The following description is based on a water spray control system, and an alternative configuration scheme is described in 3.1.

2.1 Description of the controlled system

Once the desuperheater is used, the controlled system begins at the steam inlet of the desuperheater until the heating surface exit steam temperature measurement until. It contains the linear characteristics of the desuperheater and the heating surface, including the unheated connecting pipe, the diverting system and the confluence system, the following inputs the amount will affect the control system.

2.1.1 Absorption of heat

The heat absorption of the heating surface is a disturbance variable for the fluid side control (desuperheater, heat exchanger) and for the flue gas side control (flue gas) Reflux, tilt burner) is an operational variable.

Experience has shown that changes throughout the heating process are difficult to measure, so they are derived from easily measurable quantities.

For example, feeder speed, fuel flow, and flue gas flow, and the subsequent process is considered to have linear characteristics (eg, heat release).

2.1.2 Steam flow

Steam flow is another disturbance variable. Contrary to the heat absorption rate, the steam flow is easy to measure, so it can be used as a disturbance.

The dynamic variable uses this information as a feedforward signal to improve control performance. Usually it is not used as a manipulated variable.

2.1.3 Inlet temperature

The steam temperature entering the control system is another disturbance variable.

2.2 Design

The design of the superheater is based on the design of the boiler structure and the thermal design associated with the piping material being used. Control system Sex is affected by the design within a certain range, such as the way of conducting heat is designed as the radiation or convection of the hot surface, when the heat is conducted Choose co-current or reverse convection.

It is easy to form a good quality control by the following.

2.2.1 Heat absorption

The lower the heat absorption as it flows through the heated surface being controlled, the better. When the control performance requirements (overshoot range) are strict, and the disturbance is large at a rapid time, heat absorption (such as an increase in the temperature of the steam on the heating side of the control system) should be low. If there is no opposite design reason, for the superheater for large boilers with steam temperatures in excess of 500 ° C, the goal is to have a maximum heat absorption of 50 K to 70 K for the last stage superheater. One way is Multi-stage superheater and multi-stage desuperheater are used.

GB/Z21193.3-2007/IEC/TR62140-3:2002