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**Fossil-fired steam power stations -- Part 2: Drum-level control
(English Translation)**

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Table of Contents

- Foreword
- Introduction
- 1 Scope
- 2 Charged system
 - 2.1 Accused of system description
 - 2.2 Structure and design
 - 2.3 Steady-state and transitional characteristics

Foreword

GB/Z21193 "mineral burning steam power station" is divided into the following sections.

- Part 1. Limiting control;
- Part 2. drum water level control;
- Part 3. steam temperature control.

This guidance document is Part 2 of GB/Z 211193.

This Guidance Document is Equivalent to IEC/T R62140-2..2002 "Mineral Combustion Steam Power Plant Part 2. Drum Level Control System "(English version).

For ease of use, the following compilation changes have been made to IEC/T R62140-2..2002.

- "technical report" be replaced by "technical guidance document";
- Remove IEC/T R62140-2..2002 Foreword;
- Remove IEC/T R62140-2..2002 introduction.

This guidance document is proposed by China Machinery Industry Federation.

The guidance of technical documents by the National Industrial Process Measurement and Control Standardization Technical Committee second sub-technical committee.

This technical guidance document is drafted by. Southwest University.

The guidance of technical documents Participated in the drafting of. Mechanical Industry Instrumentation Technology and Economy Institute, China Sihe Instrumentation Mission, Xi'an Thermal Research Institute Co., Ltd., Beijing Machinery Industry Automation Institute, Shanghai Institute of Industrial Automation Instrumentation.

Introduction

This Guidance Document is part of a series of Guidance Notes, which contains information on the control of the Mineral Burning Power Station Proper design and operation of the road. They are based on the technology solutions currently in use and at the same time, for the correct understanding Guidance documents also provide the necessary background information.

This Guidance Document presents or contains special technical solutions that address the needs of similar user needs and form A well-established method to represent the functional needs of operators and suppliers of Fossil-fired power plants.

Within the given time frame, this Guidance Document is strictly considered as a specific example of a technology solution that is intended to encourage on the topic of unity of view and promote discussion.

There are two types of instructional technical documents in this series.

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

The second type of guidance document points out special ways to ensure proper operation under constraints, such as ascent and descent or in abnormal operating conditions, or they are related to the main control system of the furnace, such as load control system or frequency control system. These ones Guided technical papers usually unit the power station as a whole.

Each of the instructional technical papers in this series is independent of each other, however, their content is largely coordinated.

This series can be added.

GB/Z21193.2-2008/IEC TR62140-2.:2002 Mineral burning steam power station Part 2.
Drum water level control

1 Scope

The subject of this guidance document is natural or forced circulation control of the drum level of a mineral-fired steam power station.

This guidance document first describes the description, structure and design of the controlled system, steady-state characteristics, transitional process characteristics and perturbation characteristics, and then Described the necessary control structure, followed by three have been verified control loop configuration, and gives their application site. this the final guidance document is necessary to form the various measuring elements and

actuators necessary for the control loop, National statutory requirements, such as monitoring of the drum level and safety requirements, must also be taken into account.

2.1 Accused of system description

Feed water flows into the circulation system of the boiler in a natural or forced circulation mode and discharges saturated steam and finally soft water. Such as If there is a difference between the mass flow into and out of the system, the capacity of the circulatory system changes, so the change in capacity is the difference in mass flow the time integral.

Normally only the steam drum level of the recycle system can be used as a measure of boiler capacity, which may exist in some boilers Drums, drums are usually completely filled with water, so there is no more relationship to this guidance document. As long as there is mass flow between Deviation, SAIC (hereinafter referred to as the drum) of the water level will change, therefore, the level of the drum water level control task is to adjust the steam flow Section water flow to ensure that the drum water level within a certain limit. It is used to bypass the water flow of the steam drum to reduce the water flow rate of superheated steam and in order to eliminate impurities in the drum drainage water flow, should be considered as disturbance variables. However, the main disturbance variable is the steam flow generated by the boiler the amount. In addition, other disturbing variables, such as steam pressure, feedwater pressure and furnace output, also have an indirect effect.

2.2 Structure and design

The characteristics of the controlled system are affected by the following technical dimensions.

2.2.1 Drum size

The minimum size required for a drum is usually determined by the task of separating saturated steam from the circulating water. Drum with boiler capacity the smaller the control of the water level, the harder it becomes due to the influence of the maximum rate of change of water level on the control characteristics.

2.2.2 Drum water level set point position

The water level set point is determined by the drum design. The water level set point should be set at a position where the rate of change of the water level is as small as possible. example for example, horizontal cylindrical drum at the center line.

2.2.3 Economizer size and location

The enthalpy of the water entering the drum should be as close as possible to the enthalpy of the saturated fluid.

2.3.1 Ideal control characteristics of the definition

A simple water level controlled system shows "integral" characteristics and can be thought of as a "non-self-balancing controlled system" [see Figure 1a)]. It can be to use the integration time T_1 to describe.

2.3.2 Differences between ideal control features

The actual control of the water level is different from the ideal control for a variety of reasons. However, it is not required to determine water very accurately A bit of the actual control characteristics, an approximation has usually been able to meet the description of the control characteristics. This difference is based on the evaporation medium is water, steam mixed the actual situation of the compound. The volume of fluid is related to both pressure and temperature, so various phenomena similar to the phenomenon of delay time can appear GB/Z21193.2-2008/IEC TR62140-2.:2002