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**Technical specifications of flame-temperature image detection
for coal-fired boiler**

燃煤锅炉火焰温度图像检测技术规范

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

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Introduction

Flame temperature image detection is a flame temperature measurement method based on visible light image acquisition and processing, which can realize the flame image in real time.

It can accurately measure the flame temperature and has the advantages of non-contact measurement, real-time measurement of dynamic temperature field, wide temperature measurement range, multiple display modes and remote monitoring, and is widely used in coal-fired boilers, oil-fired boilers, biomass boilers, waste incinerators, and the steel, chemical, and cement industries.

In recent years, the resolution and temperature measurement accuracy of flame temperature image detection have been continuously improved.

It plays an important role in the fields of flame temperature field measurement, combustion stability monitoring, etc., and is an important tool for realizing the digitalization and intelligence of boiler operation.

The development of flame temperature image detection technology can provide a reference for the research of basic combustion theory, the development of advanced combustion technology, and the combustion control of boilers and industrial furnaces.

Provide basic testing technology support.

Technical specification for flame temperature image detection of coal-fired boilers

1 Scope

This document provides the basic principles of coal-fired boiler flame temperature image detection technology, specifies the detection system hardware and software, layout and maintenance. The technical requirements of flame protection, detector calibration, detection, etc. are proposed, and the calculation method of flame image detection is given.

This document is applicable to non-contact temperature image detection of coal-fired boiler flames, oil-fired boilers, biomass boilers, waste incinerators and coal-fired oil-fired boilers.

The non-contact image detection of industrial furnace flame temperature is implemented as a reference.

2 Normative references

GB/T 1576

GB/T 12145

GB/T 13277.1

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 flameimage

The flame radiation is converted into a visible light color image by the imaging element after analog-to-digital conversion.

3.2 flame image RGB value RGB valueofflameimage

The stimulation values of flame radiation in the three primary colors of red, green and blue.

Note. R refers to red, G refers to green, and B refers to blue.

3.3 Flame image imaging element flameimagecomponent

A CCD (charge coupled device) or CMOS (complementary metal oxide semiconductor) sensor to acquire flame images.

3.4

The temperature information image obtained after flame image processing.

3.5

The relative error between the flame image temperature detection value and the actual value.

3.6

Used for verification or calibration of radiation thermometers, with stable temperature control and clear emissivity, and the thermal radiation characteristics are close to the concave shape of a black body