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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 10180-2017

Replacing GB/T 10180-2003

Thermal performance test code for industrial boilers

工业锅炉热工性能试验规程

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Table of Contents

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 10180-2003 "Industrial Boiler Thermal Performance Test Procedures", compared with GB/T 10180-2003, except for The major technical changes outside of this series are as follows:

--- Modify the scope (see Chapter 1, Chapter 1 of the.2003 edition);

--- Added and modified terms and definitions (see Chapter 3, Chapter 3 of the.2003 edition);

--- Added and modified symbols and units (see Chapter 4,.2003, Chapter 4);

--- Modify the method of determining the base temperature of the boiler in the styling test and acceptance test (see 5.7,.2003 version 7.10);

--- Modify the measurement accuracy of some instruments and equipment (see Table 6,.2003 version 9.4~9.8);

--- Modify the formula for calculating the thermal efficiency of the superheated steam boiler [see Equation (5), Equation (6), Equation (7),.2003, Equation (5), Equation (6)];

--- Modify the error provisions of the boiler thermal efficiency calculation results (see 10.1.2,.2003 version 9.3);

--- Modified sampling and preparation of coal and pulverized coal (see Appendix C, Appendix A of the.2003 edition);

--- Modify the use of the Austenitic analyzer (see Appendix E, Appendix C of the.2003 edition);

--- Modify the measurement and calculation of heat loss (see Appendix F, Appendix D of the.2003 edition);

--- Added boiler thermal balance system boundary map and related requirements for thermal performance test (see 5.1);

--- Increased the validity of the test data record requirements (see 5.8);

--- Increased thermal efficiency calculation method for multi-function boilers (see 10.2);

1 Scope

GB/T 10180-2017 is the Chinese national standard on thermal performance test code for industrial boilers, in the field of energy and heat transfer engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 12 July 2017 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 February 2018. Classification: ICS 27.060.30, CCS J98. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the terms and definitions, symbols and units, general rules, test preparations, and test requirements in the thermal performance test of industrial boilers. Measurement items and test instrumentation, test methods, calculation of boiler thermal efficiency, and test report. This standard applies to solid fuel boilers and liquid fuel boilers whose rated pressure is less than

3.8 MPa and whose medium is water or liquid organic heat carrier. Thermal performance tests for furnaces, gas-fired boilers, and electric heating boilers. Oilfield steam injection boiler, waste heat utilization device or equipment (excluding flue type waste heat boiler), steam pressure not less than 3.8MPa and steam temperature The degree of less than 450 °C boiler can refer to use.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article Pieces. For undated references, the latest version (including all amendments) applies to this document. Determination of total moisture in

GB/T 211 coal Industrial analysis method for GB/T 212 coal

GB/T 213 Coal Calorimetry Method Determination of Total Sulfur in GB/T 214 Coal

GB/T 260 Petroleum Products Moisture Determination

GB/T 384 determination of calorific value of petroleum products Preparation of

GB/T 474 coal sample Determination of Carbon and Hydrogen in GB/T 476 Coal

GB/T 508 ash determination of petroleum products

GB/T 1884 Laboratory determination of density of crude oil and liquid petroleum products (densitometer method)

GB/T 2900.48 Electrical terminology boiler

GB/T 3286 (all parts) Methods for chemical analysis of limestone and dolomite

GB/T 6284 General method for determination of moisture in chemical products Dry reduction method Test and Evaluation of

GB/T 8174 Equipment and Pipeline Thermal Insulation Effect

GB/T 10184 Power Station Boiler Performance Test Procedures

GB/T 10410 Gas and chromatographic analysis of major components of artificial gas and liquefied petroleum gas

3 Terms and Definitions

The definitions of GB/T 2900.48 and the following terms and definitions apply to this document.

3.1 Solid fuel solidfuel Solid fuels include coal, oil shale, biomass fuels, and flammable solid wastes.

3.2 Liquid fuel Liquid fuels, including petroleum, fuel oils, and industrial waste fluids (such as lye, magnesium, etc.).

3.3 Gas fuel gasfuel Gaseous fuels include natural gas, blast furnace gas, coke oven gas, city gas, and liquefied gas.

3.4 Lower heating value netcalorificvalue The amount of heat released from the complete

combustion of a unit volume of gaseous fuel or unit mass of solid or liquid fuel under specified conditions The vapor in the gas condenses into the heat obtained by the latent heat of vaporization of water.

3.5 Heat output heatoutput The difference between the amount of heat that is provided by steam, water, or other working fluid from the boiler outside and the water or other working fluid that enters the boiler.

3.6 Boiler net efficiency netboile reliability The boiler effectively uses heat to deduct boiler efficiency after self-used steam and auxiliary equipment consume power to convert heat.

3.7 Positive balance method directprocedure The method of directly measuring the input heat and output heat to determine the thermal efficiency of the boiler is also called a direct measurement method or an input-output method.

3.8 Anti-balance measurement indirectprocedure Methods for determining the thermal efficiency of boilers by measuring heat losses from various combustion products and boiler heat loss, also known as indirect measurement methods, heat losses Method or energy balance method.

3.9 Multi-purpose boiler multimediumboiler There are two or more types of heated working fluids (such as water and steam, heat carrier and hot water, heat carrier and water) in the boundary of the boiler heat balance system. Air, etc.) and output to the boilers of the respective thermal equipment.

3.10 Desulfurizer desulfurizer Used to capture and absorb sulfur dioxide in flue gas additives.

Note. This standard specifically refers to limestone (its main component is CaCO3, with a small amount of MgCO3, impurities and water).

3.11 Calcining reaction calcination reaction The desulfurization agent decomposes into an endothermic chemical reaction of CaO, MgO, and CO2.

3.12 Sulfation reaction sulfation reaction An exothermic chemical reaction of CaO, MgO with O2, SO2 to produce CaSO4, MgSO4.

4 Symbols and units

The symbols and units listed in Table 1 apply to this document. Table

1 Symbols and Units No. Symbol Name Unit Remarks 1 sumA total heated area m2 2 AAH air preheater heating surface m2

5 Boiler heat loss kJ/kg or kJ/m3 177 Q

6 Ash physical heat loss, namely slag, recycling ash, flue ash (deposition ash) The sensible