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NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 10127-2018

Replacing JB/T 10440-2004

**Performance design standard for furnaces and burners of
large-capacity pulverized-coal-fired boilers**

大型煤粉锅炉炉膛及燃烧器性能设计规范

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Foreword

This document was issued on 25 December 2018 by the National Energy Administration of the PRC and takes effect on 1 May 2019.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 27.060.30, Chinese classification J98.

It replaces JB/T 10440-2004, which is superseded.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 'Directives for standardization - Part 1: Structure and drafting of standards'.

This standard supersedes JB/T 10440-2004 'Performance design standard for furnaces and burners of large-capacity pulverized-coal-fired boilers'.

Compared with JB/T 10440-2004, the main technical changes of this standard are as follows:

- two clauses, 'General requirements' and 'Design conditions', have been added;
- the former Clause 5 'Determination of the effective furnace volume and calculation formulas of furnace thermal characteristic parameters' has been split, each part now forming a clause of its own;
- the 600 MW unit content of former Table 2 'Recommended ranges of furnace thermal characteristic parameters for tangential firing (BMCR condition)' has been modified and 1 000 MW unit content has been added;
- the 600 MW unit content of former Table 3 'Recommended ranges of burner operating parameters for tangential firing with direct-firing pulverizing system (BMCR condition)' has been modified and 1 000 MW unit content has been added;
- the 600 MW unit content of former Table 6 'Recommended ranges of furnace thermal characteristic parameters for opposed firing (BMCR condition)' has been modified and 1 000 MW unit content has been added;
- the 600 MW unit content of former Table 7 'Recommended ranges of burner operating parameters for opposed firing with direct-firing pulverizing system (BMCR condition)' has been modified and 1 000 MW unit content has been added;
- the 300 MW unit content of former Table 9 'Recommended ranges of furnace thermal characteristic parameters for W-flame firing (BMCR condition)' has been modified and 600 MW unit content has been added;
- former Table 10 'Recommended ranges of operating parameters of double-cyclone separator burners for W-flame firing (BMCR condition)' and Table 11 'Recommended ranges of operating parameters of dual-register swirl burners for W-flame firing (BMCR condition)' have been merged into Table 10 'Recommended ranges of burner air distribution parameters of W-flame boilers with direct-firing pulverizing system (BMCR condition)'; the 300 MW unit content of Tables 10 and 11 has been modified and 600 MW unit content has been added.

This standard was proposed by and is under the jurisdiction of the National Technical

Committee on Boilers and Pressure Vessels of Standardization Administration of China (SAC/TC 262).

Drafting organizations of this standard: Shanghai Puhua Coal Combustion Technology Research Center, Shanghai Power Equipment Research Institute Co., Ltd., Harbin Boiler Company Limited, Shanghai Boiler Works Co., Ltd., Dongfang Electric Corporation Dongfang Boiler Group Co., Ltd., Babcock and Wilcox Beijing Co., Ltd., Wuhan Boiler Co., Ltd., Wuxi Huaguang Boiler Co., Ltd., Xi'an Thermal Power Research Institute Co., Ltd., Ha'erbin Dianzhan Shebei Chengtao Sheji Yanjiusuo Youxian Gongsi, Tsinghua University, Harbin Institute of Technology, Xi'an Jiaotong University and Huazhong University of Science and Technology.

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The previous edition of the standard superseded by this standard is: JB/T 10440-2004.

Publication data

NB/T 10127-2018 is an energy industry standard of the People's Republic of China, issued by the National Energy Administration on 2018-12-25 and implemented from 2019-05-01. It is classified under ICS 27.060.30 and CCS J98.

The standard was approved by National Energy Administration Announcement No. 16 of 2018, which, in accordance with the relevant provisions of the Notice of the National Energy Administration on Issuing the Administrative Measures for Industry Standardization in the Energy Sector (Trial) and its Implementing Rules (Guonengju Keji [2009] No. 52), approved and published 204 industry standards, comprising 32 energy standards (NB) and 172 electric power standards (DL).

In the list of industry standards annexed to the announcement, NB/T 10127-2018 appears as item 28, superseding JB/T 10440-2004, with Xinhua Publishing House as publisher, approval date 2018-12-25 and implementation date 2019-05-01.

1 Scope

NB/T 10127-2018 sets the performance design rules for the furnaces and burners of large pulverised coal boilers - units of 300 MW and above - replacing JB/T 10440-2004. The furnace is where a large boiler's reliability is decided: size it too small and the ash slags on the walls and the superheater overheats; fire it badly and nitrogen oxide emissions rise, combustion is incomplete and the flame impinges on the tubes. The standard gives the scope, the normative references and the defined terms and symbols, then the coal properties that govern design - heating value, volatile content, ash content and fusion temperature, slagging and fouling indices - and how they are classified. It sets out the

choice of firing system: tangential corner firing, wall firing with front or opposed burners, and down-shot W-flame firing for low-volatile anthracite. Furnace sizing follows, with the heat release rates per unit volume, per cross-sectional area and per burner zone, the furnace height and the residence time, and the limits on each by coal type. Burner design covers the arrangement, the primary, secondary and over-fire air proportions and velocities, the low-NO_x staging, and the flame stabilisation needed for low-load operation. The furnace exit gas temperature, the thermal calculation and the performance guarantees and their testing complete the standard.

1.1 This standard specifies the firing modes of large-capacity pulverized-coal-fired boilers, the method for determining the effective furnace volume, the selection of furnace thermal characteristic parameters and burner design parameters, the evaluation indices of furnace and burner design performance, and other requirements related to type selection and design.

1.2 This standard is applicable to the performance design of furnaces and burners of large-capacity pulverized-coal-fired boilers matched with generating units of the 300 MW class and above (maximum continuous evaporation of the 1 000 t/h class and above); pulverized-coal-fired boilers for generating units with a capacity below 300 MW may also refer to it. This standard is not applicable to pressurized combustion boilers, cyclone-fired boilers or wet-bottom (slag-tap) pulverized-coal-fired boilers.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all amendments) applies.

GB/T 211 Determination of total moisture in coal

GB/T 212 Proximate analysis of coal

GB/T 213 Determination of calorific value of coal

GB/T 214 Determination of total sulfur in coal

GB/T 219 Determination of fusibility of coal ash

GB/T 476 Determination of carbon and hydrogen in coal

GB/T 1574 Test method for analysis of coal ash

GB/T 2565 Determination of grindability index of coal - Hardgrove method

GB/T 2900.48-2008 Electrotechnical terminology - Boiler

GB/T 3715 Terms relating to properties and analysis of coal

GB/T 10184 Performance test code for utility boiler