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### 一种新型燃用煤粉工业锅炉燃烧器流场特性研究

王进卿, 池作和, 孙公钢, 曾宪阳

(中国计量学院 计量测试工程学院; 浙江 杭州 310018)

【摘要】 针对一种新型的燃用煤粉工业锅炉燃烧器, 利用计算流体力学软件, 通过改变一、二次风速及内二次风旋流强度以及钝体流通阻塞率等参数, 模拟燃烧器出口附近流场分布, 研究不同参数下回流区大小及回流量的变化, 分析流场的湍流强度分布. 结果表明, 回流区长度与内二次风速、内二次风旋流强度及钝体阻塞率成正比, 与一次风速成反比. 回流量总体上随着内二次风旋流强度、内二次风速、一次风速的增加而增大; 改变钝体阻塞率, 则有较复杂的变化. 湍流强度沿径向呈先增后减的变化, 沿轴向则在某个截面后不断衰减.

【关键词】 燃煤工业锅炉; 燃烧器; 回流特性; 湍流强度; 数值模拟

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## Study on flow field characteristics of a new burner of industrial pulverized coal fired boiler

WANG Jin-qing, CHI Zuo-he, SUN Gong-gang, ZENG Xian-yang

(College of Metrology and Measurement Engineering; China Jiliang University;  
Hangzhou 310018; China)

**Abstract:** A new burner of industrial pulverized coal fired boiler was studied by using the computational fluid dynamics software. The flow field distribution of the burner outlet was simulated by changing the parameters such as the wind speed of the primary and secondary air, the swirling number of the inner secondary air and the blocking rate of the bluff body. The dimension of the recirculation zone and the quantity of recirculation were studied by changing the parameters. Then the turbulence intensity distribution was analyzed. The results show that the length of the recirculation region is proportional to the wind speed of the inner secondary air, the swirling number of the inner secondary air and the blocking rate of the bluff body, but is inversely proportional to the wind speed of the primary air. The quantity of recirculation is increased with the increment of the

swirling number of the inner secondary air, the wind speed of the inner secondary air and the wind speed of the primary air. The quantity of recirculation has complex changes when changing the blocking rate of the bluff body. The turbulence intensity is first increased and then decreased in the radial direction, and is attenuate in the axial direction after one cross section.

**Key words:** industrial pulverized coal fired boiler; burner; recirculation characteristics; turbulence intensity; numerical simulation

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【作者简介】 王进卿（1985-），男，浙江义乌人，硕士研究生.主要研究方向为能源开发与利用.

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