

2001 **Title:** **CFD Modeling of Combustion Air Systems for Wood-Fired Boilers**

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**ABSTRACT:**

Considerable effort has been spent on developing CFD-based models of industrial boilers. Improvements in computer hardware, solution algorithms, fundamental data, and end-user acceptance has made CFD models practical for engineering evaluations of boilers. CFD-based models for hog fuel combustion have lagged behind those for other fuels such as coal or black liquor. However, the use of these models for wood-fired boilers has become more commonplace as air emission regulations have tightened, the need to dispose of sludges and non-condensable gases in these boilers has intensified, and the cost of fossil fuels has increased.

Case studies of wood-fired boilers show model predictions of CO burnout, flue gas temperatures, O<sub>2</sub> distribution, flue gas velocities, particle carryover, and NO and SO<sub>2</sub> profiles in the boiler. In cases where boiler air system modifications have been made, the results have supported the CFD model predictions. The desire to ensure that a wood-fired boiler upgrade will match expectations should drive the continued application and development of CFD-based models.