

A Simple Model to Predict the Start-up Process of a Once-through Boiler

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Renewable energy sources are increasingly plentiful nowadays. Therefore, the coal-fired supercritical thermal power plant needs to be started up and shut down frequently. This lead to the need of flexible operation of the supercritical once-through boiler in such a plant. A simple block model of supercritical once-through boilers is being presented which could be used for simulation of the dynamic behavior of the start-up of supercritical once-through boiler in the circulating fluidized bed power plant. The model has been developed based on the energy balance, and pressure drop of the working fluid inside the water-wall unit. The model simulates the pressure and enthalpy of working fluid. The temperature of working fluid is calculated by the function of pressure and enthalpy based on the steam tables. Since the dynamic block model could be applied to other process components such as the super-heaters or economizers, all units of the once-through system with start-up process is simulated.