

Geometrical design of stand pipe air distributors for the combustion of municipal solid waste in a fluidised bed

Abstract

The new geometrical design of stand-pipe air distributor for the combustion of the municipal solid waste was presented. The new design of the air distributors enables penetration of incombustible and unburnt carbon through opening between the air distributors, thus providing easy maintenance work. The fluidized bed experimental rig was constructed using Perspex column in which air was supplied through the distributors below it. In order to establish the final geometrical design of the air distributors, several design parameters were investigated. The effect of orifice size, distance between orifice and distance between distributor pipes on the fluidization behaviour were studied. Investigation on the effects of various orifice sizes of 1.5 mm, 2 mm, 3 mm, 4 mm and 5 mm showed that the 3 mm orifice size exhibited the most stable fluidization behaviour. Investigation on some selected orifice distances of 10 mm, 20 mm, 30 mm and 40 mm also found that the 10 mm orifice distance exhibited stable growths of bubbles. Various pipe distances of 30 mm, 40 mm, 50 mm, 60 mm and 70 mm were also investigated and the most suitable pipe distance was 70 mm.