

Experimental study to determine the effect of wire mesh pore size on natural draft chimney performance

Abstract

Chimney is an important part of the industries to remove waste heat from the processes side to the atmosphere. The increased demand of energy helps to restart to think about the efficiency of chimney as well as to find out a valid option to replace forced draft chimney system from industries. In this study natural draft chimney model is air flow rate; exit air temperature and pressure losses are studied through modification with wire mesh screen and compare the results with without wire mesh screen chimney model. The heat load is varies from 0.1 kW to 1kW and three different wire mesh screens that have pore size 0.15 mm², 0.40 mm² and 4.0 mm² respectively are used. The experimental results show that natural draft chimney model with wire mesh screens significantly restored the flow losses compared to the system without wire mesh screen. The natural draft chimney model with 0.40 mm² pore size wire mesh screen can minimize the draft losses better than others and able to enhance velocity about 54 % exit air temperature about 41% and pressure loss decreased by about 20%. Therefore, it can be decided that the wire mesh screens significantly minimize the draft losses in the natural draft chimney and 0.40 mm² pore size screen will be a suitable option