Environmental Engineering and Management Journal December 2022, Vol. 21, No. 12, 2031-2042
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

INVESTIGATION OF BURNERS USED IN WALL-HUNG COMBI-BOILERS: A COMPARATIVE AND CFD STUDY

Muhammed Arslan Omar

Department of Mechanical Engineering, Kafkas University, Kars, 36100, Turkey
e-mail: m.arslanomar@gmail.com; Phone: +90 474 2251279; Fax: +90 474 2251282

Abstract

Conventional burners having low combustion efficiency and high emissions are responsible for global warming and harming local ecosystems. Inefficient conventional technology boilers cause economic loss and pollution. In this study, different types of burners were evaluated and compared in terms of efficiency, emission values, and fuel and electricity consumption. A 2D CFD study was carried out to evaluate the conventional burner by a commercial software, Ansys Fluent 16.0. It has been determined that the efficiency, fuel consumption, and emission values of the semi spherical/cylindrical combi-boilers were better than the conventional combi-boilers; therefore, they were both economic and environmentally friendly. From the standpoint of exhaust emissions, semispherical burners produced 5-15% fewer emissions than conventional burners. The fuel savings and economic gains achieved in the new generation semispherical/cylindrical and ceramic burners used in the combi-boilers were substantially higher.

Key words: burners, CFD study, efficiency, emission, global warming

Received: May, 2022; Revised final: November, 2022; Accepted: November, 2022; Published in final edited form: December, 2022