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[Dragoljub Dakić](#), [Srđan Belošević](#), [Rastko Mladenović](#), [Milijana Paprika](#), [Dejan Djurović](#), [Aleksandar Erić](#), [Mirko Komatina](#), [Boško Grbić](#), [Nenad Radić](#)

REDUCTION OF CARBON MONOXIDE EMISSION FROM A SOLID-FUEL THERMO-ACCUMULATION FURNACE

ABSTRACT

Many households in Serbia, using electric thermo-accumulation furnaces for heating, have been forced to find an alternative solution, due to a significant increase in electricity prices during the last decade. A possible solution is replacing electric heating appliances with the solid fuel-fired ones. A prototype of a new concept of thermo-accumulation solid fuel-fired furnace has been developed to meet these growing needs, providing electricity saving together with considerable environmental benefits. Two strategies for reduction of carbon monoxide emission are examined in the paper: application of Pt/Al₂O₃ catalyst, in the form of 3±0.3 mm spheres, providing further combustion of flue gases within the furnace, as well as an additional emission reduction by means of the air excess control. Experimental investigations of the catalyst influence on the conversion of carbon monoxide have been done for different operation regimes and positions of the catalyst. The paper presents selected results regarding carbon monoxide emission during wood and coal combustion. Investigations suggest a considerable effect of the catalyst and a strong influence of the catalyst position within the furnace to carbon monoxide emission reduction. In addition, experimental tests have been conducted to assess the effect of the air excess control in the furnace on carbon monoxide emission. The amount of combustion air, the flue gas flow rate and the fuel feeding regime have been adjusted in order to keep the flue gas oxygen content in a relatively narrow range, thus obtaining controlled combustion conditions and lower carbon monoxide emission. In this way, the furnace has been made able to respond to the changes in heating needs, fuel quality and other parameters, which is advantageous in comparison with similar solid-fuel fired furnaces.

KEYWORDS

[thermo-accumulation furnace](#), [solid fuel](#), [emission reduction](#), [catalyst](#), [air excess control](#)

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