

THE POSSIBILITY OF FIRESIDE CORROSION OCCURRENCE IN DOMESTIC BOILERS FURNACES WITH LOW NO_x COMBUSTION TECHNOLOGY

G.Bakić, V.Šijački, M.Đukić, D.Tucaković, D.Stojiljković, B.Rajičić, G.Stupar

Faculty of Mechanical Engineering, Kraljice Marije 16, Belgrade, Serbia

The emission of nitrogen oxides (NO_x) during combustion of fossil fuels is considered as one of the major sources of environmental hazards. As a result, the limitations of concentration of nitrogen oxides in fuel gases are regulated. The implementation of low NO_x burners in pulverized coal-fired boilers has led to a rise in the fireside corrosion rate of the waterwall boiler tubes in some power plants. Under normal combustion conditions, an oxidizing atmosphere helps formation of a protective oxide scale on the surface of the boiler tubes, thus impeding gaseous corrosion. However, the use of low NO_x technology changes the combustion environment, resulting in the presence of reduction gases characterized by large amounts of CO and H₂S. In areas of reducing atmosphere, a porous, non-protective scale is produced on the waterwalls that could lead to significant metal loss per year due to corrosion. In order to better understand the mechanisms and kinetics of the fireside corrosion, it was determined that, in addition to the type of atmosphere formed during fuel combustion, coal composition has an important role in the occurrence of fireside corrosion. The aim of this paper is to analyze the possibility of occurrence of fireside corrosion, i.e., determine the corrosion potential of domestic coals and identify possible problems that could occur during combustion using low NO_x technologies.

Key words: gaseous corrosion, low NO_x, corrosion protection