The aim of this study was numerical simulations, of protection air system in front wall fired boiler OP650 K5 in Rybnik Power Plant. Simulations of the furnace process with and without protection air system were done.

Measurement of boundary gas composition layer on left, rear and right wall in boiler for different cases of working boiler OP650 was done. Then numerical simulation of that different cases of working boiler was done to comparison measurement with simulations.

Fuel for boiler OP650 was coal – characteristic parameters used: coal granulation as grain’s share bigger then x, coal analysis as recived state - lower heat value and elementary analysis.

The four case (A, B, C, D) of working boiler was implemented for numerical modelling. In this case boiler worked with 160MW and 215MW nominal output with various mills (burners) worked and with or without Protection Air System (PAS).

Additional simulation of new concept of Protection Air System for B and D cases of working boiler was done. That modelling is signed with “N” letter, for example NB means modelling the new protection air system for conditions of working boilers described in case B.