



NOX AND SOX REDUCTION FROM BIOMASS BOILERS IN CONDENSING UNIT WITH DIFFERENT SOLVENTS

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ABSTRACT

It is not a secret any more that our environment is in big danger. Global warming doesn't seem to be the only problem. Also acid rains, smog, eutrophication and other issues harm environment but most important human health. The main reason is considered to be the use of fossil fuels.

Whereas, reasonable biomass combustion causes less damage to the environment as it is CO₂ neutral. Despite this fact, the major part of society thinks that biomass combustion has more disadvantages than natural gas, because of the higher emissions and higher moisture content. Therefore flue gas condenser (DK-15) with ammonia and urea injections has been developed to convert these disadvantages to advantages. DK-15 recovers energy, reduces not only NO_x and SO_x but also particulate matter and CO concentration in flue gas. Theoretically it is calculated that 15% heat energy recovery is possible therefore decreasing necessary amount of biomass for combustion as well.

Experimental test stand with two type condensers (direct and indirect) was developed in Riga Technical University Environmental monitoring laboratory. Main flue gas parameters like boiler heat output, efficiency, condenser heat output, flue gas composition, temperature in inlet and outlet and other emission characteristics were measured. Experiments were made with water, urea and ammonium hydroxide injections.

The results show that depending on test conditions practically it is possible to recover 10 – 20 % of boiler heat output. The goal of the research was to find the best working point for condenser and to compare it with the theoretical calculations. In addition emission reduction was achieved - NO_x emissions were decreased by 15 %, PM by 45 % and SO_x by 10%.