

EFFICIENCY OF COMPLEX HEAT-RECOVERY SYSTEMS AT THE HIGH MOISTURE CONTENT EXHAUST-GASES OF BOILER

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Purpose - Thermophysical substantiation of use for boiler plants with the high moisture content of exhaust-gases of heat-recovery technologies with combined use of recovered heat.

Results of work

In the work the computational studies of combined heat-recovery systems with preheating boiler water and combustion air at high moisture content of exhaust-gases of boiler have been carried out. According to research results, with an increase in the initial moisture content of the exhaust-gases X_1 from 0.14 to 0.2 kg/kg of d.g., a noticeable increase in the overall heating capacity of the heat-recovery system and a corresponding increase of the heating capacity of its elements. At the same time is rises such the general boiler efficiency increase as and the efficiency increase, which is provided by individual elements of this system.

A comparative analysis of the heat efficiency of the complex heat-recovery system and the traditional by intended for heating only the input boiler water at the same levels of initial moisture content X_1 of exhaust-gases has been carried out. It is shown that the boiler efficiency increase $\Delta\eta$ associated with the use of heat-recovery systems with heated boiler water and combustion air, is 7.8-11.4 % and on the whole exceeds the boiler efficiency increase using the traditional heat-recovery system. At the same time this excess is a most significant for low temperatures of environment. For both heat-recovery systems, the level of differences in $\Delta\eta$ values corresponding to different moisture content of X_1 is significant only at temperatures of environment above minus 10 ° C.

Significant influence on the thermal parameters of the complex heat-recovery systems of climatic conditions of their application was revealed. Thus, the average annual value of boiler efficiency increase $\Delta\eta_m$, depending on climatic zones, increases by 14–23 % compared with traditional systems.

Conclusion

The use of complex heat-recovery systems for boilers with a high moisture content of the exhaust-gases allows to increase the efficiency of the boiler plant to 7.8-11.0 %.