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THE SPECIFICS OF FLOW IN MICRO-FLAME BURNERS WITH HORSESHOE-SHAPED ARRANGEMENT OF THE FLAME STABILIZERS

N. Fialko, Y. Sherenkovsky, V. Prokopov, N. Polozenko, S. Aleshko, O. Maletskaya, E. Milko, A. Ozerov, O. Kutnyak, L. Butovsky

The article is devoted to the basic regularities identification of fuel and oxidizer flow in micro-flame burner devices with U-shaped echeloned grates of flat flame stabilizers. The relevance of mentioned burner type application is discussed. The use of latter is associated, in the first place, with ability to generate the desired temperature field in the combustion zone to reduce the thermal load on the boiler embrasure walls is noted.

The results of mathematical modeling for considered physical situation are introduced. Comparative analysis structure data of flow for U-shaped and stair shape echeloned grates of the stabilizers as well as for the conditions when the ends of the stabilizers are arranged in the same plane are represented.

The features of manifestation of the air consumption redistribution effect in channels of echeloned grates compared with the lack of echeloning condition are analyzed. It is noted that according to the data obtained in the case of separation of the flame stabilizer airflows increases in channels adjacent to the first upstream stabilizer, and reduced in the other channels.

The results of the research of reverse flow zones characteristics at stabilizer back-stern-part areas are adduced.

The governing regularities findings for velocity pulsations behavior in the considered burner are discussed. The greatest value of the meansquare velocity pulsations, in all the situations that are examined, observed over the stabilizer stalling edge is indicated. However, in the case of not echeloned grate the pulsations field patterns are conformable over all the stabilizers, but in the case of its echeloned arrangement - essentially different for different stabilizers are found. Under the conditions as U-shaped and stair shaped echeloned grates, over the first upstream

stabilizer (central for the U-shaped arrangement of stabilizers and lower peripheral for their stair shaped arrangement) the velocity pulsations levels are significantly higher than for the other stabilizers are found. Meanwhile, the mentioned levels values over the first stabilizer are close to those in the case of the echeloning absence. Thus, integrally, the flow turbulization behind stabilizer grates is more significant in case of in plane stabilizer ends arrangement, is shown.

The research data regarding the pressure loss in the burner devices with U-shaped and stair shaped echeloned grates of stabilizers are analyzed. In mentioned situations, these losses are approximately equal by magnitude and somewhat smaller than for not echeloned grate of the flame stabilizers are indicated. The latter is correlated with higher level of flow turbulence at the stabilizer back-stern-part under the condition of in-plane their ends arrangement.