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Research of Processes in Granular Environments

Recently it is paid much attention to research of processes in granular environments. That is connected with a wide scope of such processes in various engineering units. The purpose of my work is research of processes of heat exchange in a layer of a granular material in dead and boiling layers.

Heat exchange process in a dense bed of a granular material is difficult. It consists of elementary processes of heat conductivity of a firm-gas phase, gas convection. For simplification the analytical solution of heat transfer problem, the dense bed is considered as the quasicontinuous environment characterized by effective physical properties, including effective heat conductivity. In the majority of the experimental works presented in literature on heat exchange research from a wall to gas or liquid through a granular layer it is accepted that the effective heat conductivity on all thickness of a layer remains approximately identical. In a moving layer this process becomes complicated due to hashing of particles. Intensity of a heat transfer is influenced by:

- speed of layer hashing,
- the size of particles,
- a form of a flow of a surface, etc.

Transition of a dead granular layer to a boiling condition is made not instantly, but at such speed of the fluidizing agent when hydrodynamic pressure of a flow of Pressure (P) counterbalances the Gravity (G) operating on particles. At further increase in speed the layer extends in the beginning at invariable hydraulic resistance, and at achievement of a condition of $P > G$ of a particle start to be taken out from a layer.

Thus, this work have the following tasks:

- research of Heat and Mass Transfer processes. in a granular layer;
- on the basis of researches establish influence of key parameters (heat-physical, constructional, etc.) on the heat exchange processes in a granular layer.

Now practically there are no data on heat exchange of a fast boiling layer with a channel surface though such researches are extremely necessary for development of devices with fast (high-speed, forced, circulating) granular layer .Studying the Heat and Mass Transfer processes in a granular layer for development of ways of intensification of this processes is modern direction in Power Engineering