

PROSPECTS AND DIRECTIONS OF THE DEVELOPMENT OF MACHINES, THE PRINCIPLES OF WHICH ARE BASED ON THE DIVE MECHANISMS

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Within the scientific direction of discrete-pulsed energy input, a wide range of energy-efficient equipment has been developed, which is used in various industries. Such equipment implements complex thermophysical and hydrodynamic effects due to the two-phase flow of working fluids. These include the processes of explosive boiling, cavitation. Such processes affect the disperse particles of the working environment, initiate the passage of complex chemical reactions.

The Institute developed many types of equipment for the processing of disperse systems, which proved their effectiveness in industrial use. The most widely used devices that implement one of the main mechanisms of the direction are the phenomenon of cavitation, accompanied by such effects as the shear stress, the acceleration of the continuous phase movement, the collective effects in the bubble ensemble, the perturbation of the interphase surface in gas-liquid bubble environments, and others. Experimental studies have proved the effectiveness of the use of discrete-pulse input of energy during the extraction of biologically active substances by overcoming the resistance of the internal mass transfer of the target component through the cell wall, which prevents traditional extraction methods. Cavitation methods are used for bacterial rejuvenation of the working environment, in particular, disinfection of sewage, in the food industry in the processes of pasteurization and sterilization. To neutralize acidic media, the effect of free radicals formation during slamming of cavitation bubbles is used, and their complex interaction with mineral and organic components of the medium is used. Also, many cavitation equipment is designed for emulsification and dispersion processes.

Processes for processing specific environments require a clear understanding of them and the calculation of its parameters. The purpose of each design work is to create an effective, in terms of process, equipment and minimize energy and raw material costs, taking into account the environmental aspects based on the simulation of these processes.

As a result of complex theoretical and practical work, a number of modern energy-efficient equipment was created, in which the principle of action of the cavitation phenomenon was laid. The undoubted advantages of this type of equipment are its energy efficiency, economy, and the possibility of rapid introduction into the industry.