Substantiation of Energy Parameters of a Continuous-Action Vibroextractor for a Solid-Liquid System

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The results of studies on energy consumption for the process of extracting target components with continuous vibration extraction in a solid-liquid system with a small difference in phase densities are presented. The influence of low-frequency mechanical oscillations on energy consumption is substantiated and regularities of their change from the mode parameters of the process are established. It is established that the power required to perform vibration mixing is determined by the fictitious force in the oscillatory motion and the resistance created by the viscous friction of the mixing device in the working environment. Taking into account the fictitious component of the vibrating mixing system, the equation of total energy consumption for the continuous vibration extraction process is obtained. For the interpretation of the obtained experimental dependencies, the energy consumption by the vibration mixing devices was calculated. It has been shown that vibration mixing allows for the efficient use of the energy invested in a unit of work volume, evenly distributing it in the cross-section of the apparatus.

Keywords: Vibroextraction, Mathematical Model, Hydrodynamics, Mass Transfer, Diffusion, Pulsating Flow.

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