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WATER-TO-AIR EJECTOR WITH DISPERSED FLUID JET RESEARCH

Ejecting (injecting) units are one of the simplest equipment which is widely used in various industrial areas. The key ejector advantages are: non-availability of moving parts, ease of manufacturing process, what allows creating the units of almost unlimited performance. The standard ejectors are the units with central jet nozzle, cylindrical mixing chamber and diffuser. Such ejectors are most frequently used in the facilities, have sufficiently extensive experimental and theoretical materials for making their engineering possible.

The ejectors with dispersed fluid jet and cylindrical mixing chamber are used less. In sugar industry such units are water, juice and syrup sulfitation tanks, saturators with first ejection stage, dust collecting units, equipment for waste energy recycling, etc. With regard to the aforesaid units the experimental and theoretical materials are not enough.

The authors performed the experimental research of water-to-air ejector with central dispersing unit and transparent cylindrical mixing chamber at laboratory hydraulic testing stand. The centrifugal spray nozzle with central opening and inclined side supply channels (nozzles diameter — 4,6,8 and 10mm) was used as a dispersing unit. The diameters of the cylindrical mixing chamber were changed within the following ranges: 15, 19, 27 and 49mm. The selected ranges allowed being within the recommended limits of mixing chamber diameter ratios to the nozzle cone diameter (K) at which the highest numeric values of ejection rate (u) have been achieved.

The conducted researches allowed to find the optimal ratio K (4,5...7) at which max u (1,5...3) value has been achieved. It was found that the ejector operation in vertical and horizontal position had considerable differences in fluid dynamics. It was experimentally proved that the ejector's position has an effect on the ejection rate value.

KEY WORDS: *ejector, nozzle, mixing chamber, ejection rate*

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ENERGY SAVING TECHNOLOGY IN MACHINES

Among the objectives of this study attributed determination of methods for limiting power influence and energy expenditure relating to transient and steady state operation of machines in packaging lines.

It is known that the number of transient process include acceleration and run characterized by variable values of kinematic and dynamic parameters. However, periods of steady movement can be represented by certain laws of the same parameters, but they are quite predictable and accordant to scope statements.

Mass, reduced driving forces and the dynamics of the resistance ratio determines dynamic of transient process. Reducing weight and increasing the difference between driving forces and forces of resistance leads to increase of dynamic components of load units and elements of kinematic pairs. It is obvious that these factors influence the course of a transition process, and reducing the latter leads to an increase of dynamic load in the form of inertia forces or moments of inertia forces. As the transition process is programmed in machines as technological process, it means that the components of the dynamic loads associated with them, can not be avoided, exactly as the need to overcome the forces of useful and harmful resistances. However, one form of inertial forces associated with unbalanced rotating masses is subject to restrictions or even complete elimination in form of normal components. In other cases, the forces of inertia can only be limited by reducing the difference between the driving forces and the forces of resistance or by programmed kinematics.

Analysis of transient process in machines with reciprocating oscillatory movement and step move of working bodies makes it possible to note the following:

- the ratio of time for working and no-load run *ceteris paribus* determine the magnitude of dynamic loads, but do not affect energy costs;
- the movement of the masses in modes of reducing their speeds in the working run periods should be evaluated as such to ensure their kinetic energy recuperation;
- using of double working bodies shifted in phases in proportion to the time of accelerated motion and slow motion compensate energy value associated with overcoming inertia forces at no-load run.

KEY WORDS: *machines, energy costs, options, driving force*