DRIVING POTENTIAL OF GASES IN THE GRAINS LAYER

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In various processes of interphase interaction, the intensity of its course is estimated by the driving potential. The driving potential of interphase heat and moisture exchange is significantly affected by the density of working gases (ρ, kg/m3). However, when moving the working gases through the layer of porous bodies, their density is also influenced by the aerodynamic drag of this layer.

Under the production conditions of domestic grain processing industries, the flow energy of the working gases of the interphase interaction can be up to 3 and more kPa.

To establish the correspondence of the experimental data to the known regularities, we obtained mathematical dependences of the density of working gases under real conditions. That is, the thickness of the grain layer is 0.2 m thick, the variable temperature is up to 160 ºC, the moisture content is from 6.5 to 14.0 g/kgdg, the fictitious speed is up to 0.5 m/s and the sedentary state of the layer is mobile. Under the above conditions, the density and volume of gases can vary up to 40% of the starting one/

In turn, the intensity of interfacial moisture exchange is quite convenient to estimate the moisture diffusion coefficient αm. The coefficient αm depends on the moisture content and temperature of the grain. Experiments known from literature for wheat grain have established this dependence in the form of a power function.

The degree of K, for different chemical composition and different sources, varies from 8 to 14. The most widely used in the calculation formulas was the value of K = 8 for shreddeds corn.

Howevar, for a layer of grains wheat this coefficient differed significantly from the widely used ones (K = 8) and actually amounted to K =17 – 18.

Taking into account the aerodynamic drag of the sedentary layer of cereals of variable thickness, this coefficient will increase even more, in proportion to the thickness of the layer and inversely proportional to its mobility.

In conclusion: 1. In the calculations of heat and mass transfer of phase media should take into account the aerodynamic resistance of the grain layer. 2. For production parameters of grain drying in mine direct-flow dryers, temperature is a more influential factor influencing the density and specific volume of working gases. 3. Unlike liquids, the dynamic viscosity of gases □ increases, and the kinematic □ (m^2/s) decreases to 11% for the parameters of the pressure in the mine grain dryer and for the parameters of the environment "summer-winter" - up to 30%. 4. The coefficient of proportionality in the calculations of the coefficient of diffusion of moisture in the body of the grain according to our research is more than twice different from the widely used.

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